2022 IEEE 8th International Conference on Computing, Engineering and Design (ICCED) | 978-1-6654-5389-9/22/$31.00 ©2022 IEEE | DOI: 10.1109/ICCED56140.2022.10010514

Applications of Artificial Intelligence and Big Data for Strengthening the Role of Intelligence in Human Security

Ahmad Shahrul Mubarok[1], Armi Susandi[1], Teddy Mantoro[1,2]
[1]Medical Intelligence Post-Graduate Program, State Intelligence College, Bogor, Indonesia
[2]Media-Tech Lab, Departement of Computer Science, Sampoerna University, Jakarta, Indonesia

Abstract— The state, through the government, should ensure national security and stability through the policies taken. For this reason, fast and accurate information and data are needed to form the basis for policymaking. Intelligence actors have an essential role in gathering information to identify and prevent threats within and outside the country. Technological advances affect changes in threats and increase the classification of these threats. Covid-19 is a real example of the threat in this era because almost all countries feel its impact. In addition to affecting health, the Covid-19 pandemic also impacts the global economic sector. The economic impact is felt by small and medium industries, goods and services products, and also the tourism sector. The method that is used in this study is a literature review from various national and international journals. AI and Big Data can be used to track viruses in real time, collect adequate public health data, and integrate vaccine use. Also, AI and Big Data can provide local decision and policy-makers with informed, evidence-based predictions. the threat of the Covid-19 pandemic and other infectious diseases that disrupt public health and have a broad impact must be anticipated and addressed in order to achieve the safety and existence of the nation and state. The author wants to emphasize the importance of the role of intelligence in anticipating threats from the visible to the invisible.

Keywords: Artificial Intelligence, Big Data, Health Security, Human Security, Covid-19.

I. INTRODUCTION

The nature of a state is a description of the heart of the government. The state is a forum for a nation created by the state itself, and the state is a forum for the government to achieve the ideals or goals of its country [1]. There is a close correlation between the nature of the scope and function of state intelligence and the nature and objectives of the state.

The nature of the scope and function of state intelligence is the result of a dialectical and interactive relationship between political thinking based on the realist paradigm and political thinkers based on the liberalist or structuralist paradigm—the country itself. Meanwhile, liberal or structuralist thought contributes complementary ideas that there is supervision or control and control that can be in the form of checks and balances on all activities or in carrying out state intelligence operations so that the authorities do not misuse them in the name of national interests or national security, including by national stability.

Intelligence is a social science because it attempts to predict political, analytic, and social behavior. Almost all academic literature on intelligence shows one word about the nature of intelligence, namely information [2].

Intelligence is not just information; intelligence is the product of an analytical process that evaluates information collected from various sources, integrates relevant information into packages, and produces a conclusion or forecast about national security dynamics using scientific solving methods. A scientific method is a social science; some things distinguish intelligence from other scientific methods or other sciences, namely secrecy and intelligence, integrated with the national security system or part of national security.

The collection of information and processing of information, together with analyzing that information for submission to policymakers, is often through highly confidential means. This is because the information is closely related to the issue of military strength, the defense capability of the opposing party, the technological progress of a country, including the national interest of the country concerned. Along with the development of information technology, intelligence communities in various parts of the world face increasing challenges from the "CNN era" characterized by broadcasting news accompanied by images and instants from reporters and experts hired by the media [3].

Intelligence has the function of early detection of a sudden threat, for that intelligence is integrated into the national security system. Under these conditions, intelligence in the form of intelligence organizations or intelligence services must be able to provide early warnings for the development of highly dynamic security conditions at home and abroad. This distinguishes intelligence organizations from other security practitioners in the national security system.

Intelligence is part of the national security system, explained explicitly through Troy, namely secret knowledge about the enemy, which stands apart from obtaining and filtering it. At the same time, Dulles interprets intelligence as clairvoyance, a skill resembling divination. , who is always on standby, and in every corner of the world, is addressed to a friend or foe [3].

From the description above, it could be understood the urgency and importance of intelligence in a national security system that identifies threats to state security so that authorized officials, based on reports from intelligence organizations, can formulate a quick response and policies. Intelligence also plays a role in strategic decision-making taken by authorized officials. With the functions possessed by intelligence, it can provide early prevention of strategic surprises or strategic surprises so that the essential life of the nation and state can be well protected. In this case, it can be interpreted that intelligence is integrated with the national security system and the national strategic system of a country.

Technological advances in the field of artificial intelligence and big data in the last decade, assisting the government in public health surveillance and monitoring epidemic outbreaks in real-time so that they can trend-now casting/forecasting disasters that will befall the community.

Big data is classified into (a) Velocity (speed, processing, and data modification that is not owned by previous technologies; therefore, Big Data are known also as "fast data" (b) Volume (Has a high availability of Information capacity)(c) Variety (having number of the different sources and channels produced and released by Big data).

Based on their sources, There are various types of Big Data: (a) molecular Big Data (obtained by means of wet-lab techniques and OMICS-based approaches, such as genomics, and post-genomics specialties, including proteomics, and interactomics); (b) imaging-based Big Data (like radionics or the massive data-mining approach to extract clinically meaningful, high-dimensional information from images); (c) sensor-based Big Data (wearable sensors); and (d) digital and computational Big Data (with an incredible wealth of data produced by the internet and devices) [4].

In 2019 the emergence of a new virus that is infecting the world today, namely Coronaviruses (CoV). The international health organization, namely the World Health Organization, states that Coronaviruses (CoV) can infect the respiratory tract in humans. The virus has the scientific name Covid-19. Covid-19 can have effects ranging from mild flu to very serious ones equivalent to or even more severe than MERS-CoV and SARS-CoV [5].

The main medium of transmission of the SARS-Cov-2 virus is droplets that are easily spread when humans interact directly at a certain distance. At the beginning of its spread, the average transmission power of the virus was still quite low, which was around 2.2 [6]. However, in its development, the SARS-Cov-2 virus underwent mutations so that several new virus variants emerged with higher transmission capabilities, as happened in England, South Africa, Brazil, and India [7]. based on data compiled by WHO on March 21, 2022, globally there were 471 million confirmed positive cases, and 6,080,000 cases were declared dead, where the country with the highest ranking was America, India, Brazil, France, United Kingdom. Indonesia is also one of the countries that have not escaped the attack of this disease and is ranked 18th in the most cases exposed to Covid-19 in the world, where based on data from the Indonesian Ministry of Health until March 21, 2022, there were 5,960,000 cases with 154,000 people died.

The Covid-19 pandemic has become one of the toughest eras for all countries experiencing it, including Indonesia. The pandemic did not only have a direct impact on health aspects but also on other aspects of life, such as economic and social aspects. The policy of social restrictions and regional quarantine has the potential to limit the community in carrying out economic activities so that the circulation of goods and services will be hampered. This condition occurred for a long time, causing a decline in economic growth in the region. Intelligence should as much as possible separate information that is relevant for review, and which is not. The decline in economic growth will be followed by other economic impacts such as an increase in the unemployment rate [8]. The economic impact due to the Covid-19 pandemic can further trigger impacts in other aspects such as social aspects. The poor are one of the most vulnerable groups to feel the impact of the Covid-19 pandemic. This has been predicted by the World Bank regarding an increase in the number of global poor people during the pandemic.

The Covid-19 pandemic also has a dire impact on investment, which makes people choose to be careful in buying goods and even investing. This pandemic has also greatly affected market projections. Investors may tend not to invest due to changing market assumptions and unclear supply chains [9].

II. RELATED WORK

Biological weaponry is more dangerous than nuclear, and the capacity for damage is enormous. Nuclear has physically eye-visible that people can recognize it. But the biological weapon is invisible; it is in the form of a powder that could spread quickly into the target population. At the same time, aggressors could create vaccines to provide immunity to their people. During World War II, anthrax was mass-produced as a weapon reserve, but it was never deployed. Anthrax is infectious but not contagious. It is used to kill a specific group. Another biological weapon in history was smallpox-infected blankets distributed to native Americans by the British Army in the 18th century during the conflict between the UK and French colonists. Then in 1972, the UN banned biological weapons, which have never been deployed in modern warfare [10].

Since that, the issue of biological weapons for warfare has not been heard much. The world was busy with the news about nuclear competition and how the US manages its strategies with countries that develop nuclear and other related issues. For decades, the US and international community have mobilized to prevent a nuclear-armed Iran. That is because of a belief that nuclear weapons in the hands of the Iranian regime would threaten Israel and present a security risk to the US, Europe, and other allies. During the 1940s and 1950s, the pioneer of a nuclear club with the technological know-how, size, and money to build nukes. By the 1970s, realities had changed. Scientifically sophisticated nations such as China (1964), Israel (1967), and India (1974) went nuclear with the help of pro-Western or pro-Soviet patrons and sponsors. While the world was busy with the nuclear issue, biological weapon was being forgotten [11].

Covid-19 is not the only pandemic happening on earth. At least 15 pandemics have occurred before the onset of Covid-19. The long history of pandemics has even begun hundreds of years BC. The pandemic began to emerge when mankind decided to leave the nomadic lifestyle and choose to settle down. However, the Covid-19 pandemic is one of the largest pandemics in human history based on the scope of spread, the number of positive cases, and the number of deaths [12].

A pandemic can be defined as an event with a high incidence or prevalence rate, mainly related to the time and scope of wide and rapid distribution [12]. Defining a pandemic as an epidemic that occurs globally. Furthermore, pandemics are usually associated with the spread of infectious disease, such as the Spanish Flu pandemic, the HIV pandemic, and the Ebola pandemic. Furthermore, based on the scope of occurrence, pandemics are divided into three categories, namely transregional (occurring on one continent or between regions), interregional (involving two or more regions), and global (occurring in almost all/all regions).[12]

SARS-Cov-2 tends to be more infectious than SARS and MERS [13]. Covid-19 is a respiratory disease with a mild to

severe spectrum. Common symptoms of Covid-19 are fever, cough, bone pain, and shortness of breath [8]. Most patients with mild infections report a loss of sense of taste and smell. It is Covid-19 with mild symptoms that make most positive cases of Covid-19 not reported so the actual number of Covid-19 infections is likely to be higher. In addition, the fairly high transmission rate also makes the number of asymptomatic infections that are not recorded even higher.

In the initial period of the Covid-19 outbreak in Hubei, around 86% of the government's Covid-19 infections were not recorded [14]. Meanwhile in India, the actual number of cases is predicted to reach 17 times compared the number of recorded cases [15]. This condition also occurs in Indonesia. estimates that the actual positive cases of Covid-19 may be 2 times the number of cases reported by the government.

Another source related to this is the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), which advocates for human security elements to acquire a broader dimension to go beyond military protection and engage threats to human dignity. OCHA's expanded definition of security covers many security areas: (a) Economic: Creation of employment and measures against poverty. (b) Food: Measures against hunger and famine. (c) Health: Measures against disease, unsafe food, malnutrition, and lack of access to primary health care. (d) Environmental: Measures against environmental degradation, pollution, natural disasters, and resource depletion. (e) Personal: Measures against inter-ethnic, religious, and other identity tensions. (f) Community: Measures against physical violence, terrorism, crime, domestic violence, and child labor. (g) Political: Measures against political repression and human rights abuses [16].

In this paper, the author will discuss the importance of the role of intelligence in anticipating threats from the visible to the invisible. The author also wants to emphasize technology as a solution to solving the problem of a pandemic that not only threatens life but also weakens the state's political, social, and economic conditions.

III. METHODOLOGY

The method that is used in this study is a literature review from various national and international journals. This method is done by summarizing any studies that can be served to increase the solid understanding of related topics. The literature review process would emphasize the key materials of any study, report, or relevant publications, therefore the results can be combined as the main foundation of the study. Through discussions of the case study on Covid-19 issues in Indonesia, we examine a way to strengthen the role of intelligence in the Human Security system by applying Artificial Intelligence and Big Data. The paper's final section will analyze the lessons learned from Covid-19 and policy implications in addressing health and human security threats.

IV. RESULT AND DISCUSSION

In the realm of intelligence, a threat is a spirit that is the basis for acting in an intelligence activity or operation. mentions that a threat is a thing, condition, event, or action that is dangerous, difficult, disturbing, or inflicting pain and harm. Associated with the national concept, threats are efforts from within and outside the country that can endanger the safety of the nation, security, sovereignty, integrity, and national interest in various aspects, whether ideological, political, economic, socio-cultural, as well as defense and security [17]

From the point of view of the spectrum, threats are divided into two, namely traditional and non-traditional or in another definition called conventional and non-conventional. On the traditional spectrum, threats are physical in nature that can be seen with the naked eye, such as armed insurgency, terrorism, maritime crimes, territorial violations, invasions, and coups. Meanwhile, non-conventional threats are invisible, such as monetary crises, corruption, sabotage, propaganda, cyber, and money laundering. With the end of the cold war, the spectrum of threats is currently more dominated by non-traditional threats, mainly driven by the development of strategic issues such as democratization, human rights enforcement, and terrorism. This condition has also shifted the national security system. which was initially centered on the state (state center security) and became centered on humans (people center security) or in another definition called human security. Through the concept of human security, threats to human security focus on seven security areas, namely: political security, economic security, food security, health security, environmental security, individual security, and community security [18]. This automatically becomes the national interest of a country, so that the threat that interferes with the process becomes a national threat that must be eliminated.

Classification of threats is also one of the elements in the essence of threats that is important for intelligence considerations [19]. also classifies these threats into four levels, namely threats on a minor (small), moderate (moderate), serious (big), and critical (very large) scale. The classification of these threats is important as a benchmark for intelligence actions so that intelligence actions can be measured, effective, and not overdose which can cause other negative impacts.

Covid-19 is a non-traditional threat because it does not specifically target military resources. Covid-19 is a threat to global security because of its enormous impact on individual security (human security) and has directly disrupted the ability of individuals to maintain a good and safe quality of life [20], especially in the area of health security and economic security. In accordance with the role assigned by Law 17/2011 to state intelligence as the first line in the national security system, the fulfillment of state safety and security of citizens is also the main thing that must be used as guidelines for acting and limiting the authority of state intelligence. Therefore, the existence of a threat to efforts to protect citizens from health and disability facilities must be one of the security issues that is part of the realm of intelligence work.

Big Data can enable monitoring of the disease outbreak in real time. With respect to previous epidemics and pandemics outbreaks, Covid-19 is unprecedented in that open-access dataset containing daily numbers of new infections broken down by country, and, in some cases, even cities, are widely available. Combined with the information we have about the movement of people, it represents the perfect dataset to combine mathematical modeling and AI[4].

AI can facilitate the diagnosis of Covid-19 cases. For instance, Infervision is a start-up that employs deep-learning medical imaging platforms for facilitating quick diagnosis of Covid-19 cases via the recognition of specific lung features[4].

In addition to a sound healthcare system, technology is the best option for anticipating a pandemic. Technology allows humans to handle it quickly. Isolation should be conducted as soon as the pandemic occurs, followed by technology use. Not every country has the advanced

technology to face a pandemic. Learning from Singapore, more than a million people have used a popular telehealth app called -MaNaDr, founded by family physician Dr. Siaw Tung Yeng, for virtual visits; 20% of the physicians on the island country offer some level of service via the app [11]. In China, they use technology installed on their smartphone to identify whether they should

be quarantined or they can go out. People have to install an application, and people can start filling in information about their current symptoms. This technology is very efficient and effective in stopping the pandemic from occurring because people do not have to see a doctor to know whether they should be quarantined or not. China initiated its response to the virus by leaning on its robust technology and artificial intelligence (AI), data science, and technology to track and fight the pandemic. In addition, tech leaders such as Alibaba, Baidu, Huawei, and more increased their company's healthcare initiatives [11].

Covid-19 is the most perfect biological weapon in the era of modern medicine, although there has been no scientific evidence that the biological weapon was intentionally made for certain purposes. However, given a large number of victims and the economic benefits for certain parties, it remains open to the possibility that the emergence of Covid-19 as a biological weapon may be intentional. Observing this, the possibility of the nature of the threat in the Covid-19 outbreak has made the outbreak into a critical category. The criticality of this threat belongs to the category of biological weapons threats that are mass in nature and related to various sectors of life. The impact of biological weapons is more dangerous than conventional terrorist threats because the victims will be more, wider and longer.

The high classification of threats to biological weapons makes intelligence placed on the collection and analysis of information the highest priority. Therefore, state intelligence is involved in dealing with the Covid-19 pandemic outbreak not in the capacity to cure patients but in efforts to identify, detect and prevent the possibility of early derivative threats that accompany the pandemic, one of which is the possibility of using the virus as a weapon of mass destruction

In a global pandemic such as Covid-19, technology, artificial intelligence, and data science have become critical to helping societies effectively deal with the outbreak. According to Forbes, AI has some benefits in fighting pandemics [11]: (a)AI can identify, track, and forecast outbreaks. AI does it by analyzing reports, social media platforms, and government documents to detect an outbreak. A Canadian startup BlueDot provides the service to detect the outbreak early. (b) AI can help to diagnose the virus. This can help front-line healthcare workers to detect and monitor patients efficiently. The speed of this technology is very reliable, and healthcare workers do not have to worry about the explosion of patients during the outbreak. Chinese giant e-commerce Alibaba offers this service with its claim of having 96% accurately diagnosing the virus within a second. (c) AI can process healthcare claims. This technology is very efficient in reducing direct interaction. The healthcare claims will be processed faster regardless of limited staff. Ant Financial provides this service. (d) AI can develop a drug. Google's DeepMind division used its newest AI algorithms to understand the protein which forms the virus and develop finding to find a cure. (e) AI can identify infected individuals. China's sophisticated surveillance devices can identify fever with facial recognition. (f) In addition to AI, big data is essential to identify and assess the risk of each individual based on their travel history, time spent in virus hotspots, and possible exposure to people carrying the virus. An excellent healthcare system with sophisticated technology can become a weapon to fight against a pandemic outbreak or possible bioterrorism attack in the future.

The national interest is the goal to be achieved by decision-makers at the national level. The state intelligence agency has the responsibility to provide intelligence products (intelligence cycle) to the president so that the president can know the threats he will face. Therefore, with AI and big data, it can provide information quickly and accurately in real-time. The information obtained is then classified using two approaches to analyze the definition of national interest. First, the logical deductive approach, namely the understanding that likes the state to always pursue the main goal of maintaining territorial and political integrity. Through this approach, the definition of national security is synonymous with a state that is under threat of political integrity or territorial legitimacy. As for countries that are already safe, this approach is not able to describe national policy issues, such as the economy and foreign relations. Second, the empirical-inductive approach is an alternative to answering the first problem. In this approach, the national interest is taken from the statements and behavior of national decision-makers if they fulfill two conditions, namely not based on personal interests and certain groups, and still adhering to the priority of national goals. Through this approach, national security will become a dynamic concept because national goals are often transformed according to the dynamics of threats in a country.

In the midst of the Covid-19 pandemic, the role of state intelligence in realizing preparedness in dealing with the development of the outbreak is important. The development of a strategic environment in the form of new variants or vaccine readiness, for example, becomes needed information, in order to avoid sudden strategies to support national policies to deal with Covid-19. In a series of activities carried out by BIN in its capacity and ability as part of the handling of the Covid-19 pandemic, it is very important in the national security system. Moreover, knowledge about Covid-19 was still very limited in the early days of the pandemic, so intelligence capabilities in gathering important information at home and abroad were very much needed.

V. CONCLUSION

The shift in the national security system which was initially centered on the state (state center security) to become human-centered (human security) has made intelligence actors have an important role to play in maintaining national security and stability. Technological advances have an important role in changing threats to national security and stability. Previously threats (threats) were visible, now threats are invisible. Meanwhile, free trade as an effect of globalization has increased the mobility of people, capital, goods, and services, thus giving an impact on various benefits, as well as causing many vulnerabilities. Therefore, gathering information from intelligence actors is very important. So that national policymakers can anticipate threats from within or from abroad.

Artificial intelligence and big data are very important in handling Covid-19 and other health threats. AI and Big Data can be used to track viruses in real time, collect adequate public health data, and integrate vaccine use. AI and Big Data can also provide local decision- and policy-makers with informed, evidence-based predictions.

The Covid-19 pandemic is one of the actual examples of a complex threat that has a wide impact on various other sectors of life, so it must be handled with a national security approach, especially through the human security framework. In addition to the estimation of these threat factors, intelligence authority can also be analyzed through the role given by Law No. 17/2011 Article 4, where through early detection and early warning, state intelligence must participate in preventing, counteracting, and overcoming any threats that disrupt security. national. Through this phrase, the threat of the Covid-19 pandemic and other infectious diseases that disrupt public health and have a broad impact must be anticipated and addressed in order to achieve the safety and existence of the nation and state.

VI. REFERENCES

[1] Soehino, "Ilmu Negara (State Science)", *Yogyakarta: Liberty*, page 146. 2000.

[2] Wibisono A. and Idris F., "Menguak Intelijen Hitam Indonesia (Revealing Indonesia's Black Intelligence)", *Jakarta: Pacivis UI*, page 110, 2006.

[3] Ikrar Nusa Bhakti, "Intelijen dan Keamanan Negara: Reformasi Intelijen Negara (State Intelligence and Security: State Intelligence Reform)", *Jakarta: Pacivis UI & FES*, Page 4, 2005.

[4] Bragazzi N.L., Dai H., Damiani G., Behzadifar M., Martini M., Wu J., "How big data and artificial intelligence can help better manage the Covid-19 pandemic", *International journal Enviromental Research and Public Health*, 17, 3176, 2020.

[5] Kirigia, J. M., & Muthuri, R. N. D. K. "The Fiscal Value of Human Lives Lost From Coronavirus Disease (Covid-19) in China". *BMC Research Notes*, *13*(1), 1–5, 2020.

[6] Sun, P., Lu, X., Xu, C., Sun, W., & Pan, B. "Understanding of Covid-19 Based On Current Evidence". *Journal of Medical Virology*, *92*, 548–551, 2020.

[7] Sun, J., He, W.-T., Wang, L., Lai, A., Ji, X., Zhai, X., Li, G., Suchard, M. A., Tian, J., Zhou, J., Veit, M., Su, S., & Su, S."Covid-19: Epidemiology, Evolution, and Cross-Disciplinary Perspectives". *Trends in Molecular Medicine*, *1550*, 1–13, 2020.

[8] Yang, L., & Ren, Y. "Moral Obligation, Public Leadership, and Collective Action for Epidemic Prevention and Control: Evidence from the Corona Virus Disease 2019 (Covid-19) Emergency". *International Journal of Environmental Research and Public Health*, *17*(8), 1–16, 2020.

[9] Akhmad, Romadhoni B., Karim, K., Tajibu, M. J., & Syukur, M. "The Impact of Fuel Oil Price Fluctuations on Indonesia's Macro-Economic Condition". *International Journal of Energy Economics and Policy*, *9*(2), 277–282. 2019.

[10] Army Technology, "Deadliest weapons: the most powerful and destructive in the world". *Army Technology,* 2018.

[11] Nurhasanah S., Napang M., & Rohman S., "Covid-19 as a traditional threat to human security", *journal of strategic and global studies,* volume 3 no 1, 2020

[12] Morens, D. M., Daszak, P., Markel, H., & Taubenberger, J. K. "Pandemic Covid-19 Joins History's Pandemic Legion". *MBio*, *1*(3), 1–9, 2020.

[13] Sun, P., Lu, X., Xu, C., Sun, W., & Pan, B. "Understanding of Covid-19 Based On Current Evidence". *Journal of Medical Virology*, *92*, 548–551, 2020.

[14] Yang, S., Dai, S., Huang, Y., & Jia, P. "Pitfalls in Modeling Asymptomatic Covid-19 Infection". *Frontiers in Public Health*, *9* (593176), 1–3, 2021.

[15] Singh, P. P., & Chaubey, G. "Seropreva- license Against SARS-CoV-2 in Indian Populations". *MedRxiv*, 2021.

[16] Human Security Unit, "Human Security in Theory and Practice". *United Nations Office for the Coordination of Humanitarian*, 2009.

[17] Sukarno I., "Buku Ajar Ilmu Intelijen, (Intelligence Science Textbook)", *Prenadamedia Group*, 2014.

[18] Subiyanto, A., Boer, R., Aldrian, E., Perdinan, P., & Kinseng, R ." Isu Perubahan Iklim Dalam Konteks Keamanan Dan Ketahanan Nasional (Climate Change Issues in the Context of National Security and Resilience)". *Jurnal Ketahanan Nasional*, *24*(3), 287, 2018.

[19] Albert, C., Baez, A., & Rutland, J. "Human security as biosecurity". *Politics and the Life Sciences*, *40*(1), 83–105, 2021.

[20] Lippi, G., Sanchis-Gomar, F., & Henry, B. M. "Covid-19: unraveling the clinical progression of nature's virtually perfect biological weapon". *Annals of Translational Medicine*, *8*(11), 693–693, 2020.