Research Paper

Changes in the Balance of International Power in the Light of China's Artificial Intelligence

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Abstract

Artificial Intelligence (AI), as a strategic technology, has provided a platform for international competition; ever since the development of the first AI strategy in 2017, to the final days of 2021, more than fifty countries drafted or declared their national strategy aiming at becoming one of the pioneering countries in this field. Although the United States is known as the current pioneering country in the field of AI, China has been able to lead in various areas related to AI, such as occupational opportunities, Internet of Things (IoT), Big Data, Blockchain, and G5, which, due to the historical significance of emerging technologies in changing the balance of power, present a clear image of what is to come at the international stage. Given the novelty of artificial intelligence in the balance of power, the author asks about the effect of China's artificial intelligence on the international balance of power. The answer is the hypothesis that China tries to effectively interact with its leading private artificial intelligence companies and implement this technology in internal, economic, and military governance. Thus, China aims to raise its national power and challenge the American hegemony through hard internal balance, paving the way for a multipolar world order alongside other regional powers leading in artificial intelligence. This could lead to further instability in the international system. The research hypothesis was analyzed using the explanatory method and Mearsheimer's Balance of Power Theory, and the data collection method consisted of library research.

Keywords: Artificial Intelligence, Balance of Power, China, Liberal Order, Mearsheimer

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1. Introduction

Within the history of international relations, emerging technologies have played a significant role in changing the balance of power in the international world by influencing economic and military means. While having a direct impact on the quality and quantity of the military equipment, combat strategies, and the decisions made by the military commanders, emerging technologies leave indirect impacts on the economy of countries, as the basis for the maintenance of military superiority, and thus shape the balance of power (Horowitz, 2018, p. 42). For instance, the invention of the railroad and steam engines, which formed the first industrial revolution (1760-1840) and led to the growth of mechanical manufacturing and increased in productivity in Britain, widened the gap between this country and other countries which, in turn, changed the balance of power in favor of the United Kingdom (Bahrami Moghadam, 1399 [2020 A.D.], p. 253). The second industrial revolution (late 19th and early 20th century) with the innovation of electricity and assembly line, brought about the mass production of weapons, tanks, trucks, radio, and airplanes, and led to the resumption of international competition. At this time, Britain, Germany, France and Russia were competing in Europe alongside the USA and Japan for control of natural resources such as oil; Yet, no country was superior to other countries. Germany, as an emerging power that wanted to contribute to the world economy, as well as the British opposition led to the outbreak of World War I (Dees & Guilhem, 2009, p. 34). The third industrial revolution (starting in the 1960s), which is also called the computer or digital revolution, created a new wave of innovations by the development of semiconductors, mainframe computers, personal computers, the internet, etc. During this period (Schwab, 2016, pp. 11-12), the United States led the world in the economic sector using the

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companies such as Google, as well as the military sector using the weapons of the Information Age, which made the US change the balance of power in the world to its favor.

Since the late 1990s, AI as an enabling means of technology like electricity and combustion engines has turned into a new strategic and field resource using a variety of data, while providing the grounds for competition between the countries and pushing them to make major investments in this area (Fischer & Wenger, 2021, p. 172). Many compare the current contest for AI to the 1960s space race or the arms race during the Cold War in manufacturing weapons of mass destruction, calling it a geopolitical contest between the superpowers of the world (FuLee, 2018, p. 201). Yet, it seems that the competition for AI will be much broader and even more multifaceted due to the genius nature of the technology. China, as one of the pioneering countries in drafting the national strategy of AI, introduced this technology as the engine for the fourth industrial revolution and aims to reach the leading position in AI within three stages until 2030. Based on the strategic programs and layouts that were put in place and enacted since 2015 to this day, China has been able to assume the leading position, far ahead of the United States, in some areas of AI (Ding, 2018, p. 9). In this study, the author asks about the effect of China's artificial intelligence on the international balance of power. Recognizing the importance of AI, the author tries to apply Mearsheimer's Balance of Power theoretical framework. To this end, the Balance of Power theory is first explained from Mearsheimer's perspective, followed by the nature, types, and applications of AI, as well as the position of the United States, China, and several leading countries in AI based on published international documents. Finally, we will explain the effects of China's AI on the international balance of power and present the conclusions.

2. The Balance of Power Theoretical Framework

As a historical theory on the organization of international politics, 16th century and later scholars regard the Balance of Power as the most famous and possibly the most effective theory for analyzing the nature of international relations. Formulated by Morgenthau after World War II and further developed by scholars such as Spykman, Aaron, Kissinger, Mackinder, and Niebuhr, this theory was theoretically accepted after reconstruction by Waltz (Chegnizadeh, 1392 [2014 A.D.], p. 232). Nevertheless, it continues to suffer from conceptual and semantic ambiguity with scholars enumerating different definitions for it. For example, Martin White counts nine different definitions, Morgenthau presents four different definitions in The Politics Among Nations, and Ernst Haas presents eight. Despite these differences, there is consensus that distributing international capabilities and power to prevent actors from dominating others benefits national security in the anarchic international order. Otherwise, to ensure their survival, political sovereignty, and security, rival countries will individually or collectively try to strike a balance to change their power posture against the dominant country for the better, prevent it from carrying out its threat, or prepare for possible war. However, countries may choose positive or negative approaches to balancing depending on domestic and international conditions. In positive balancing, countries aim to directly increase their capabilities through both internal (increasing military capabilities) and external balancing (forming alliances and providing economic assistance to allies). In negative balancing, however, countries try to adopt military and non-military policies that reduce the enemy's power (Dehghani Firoozabadi, 1395 [2018 A.D.], pp. 221-224).

Conceptually, the Balance of Power theory is based on two

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fundamental propositions: According to the first proposition, the centralization of power in one actor will compromise the security of other actors; and in the second proposition, the anarchic international order forces states to counter the concentration of power to survive and bolster their security. Therefore, in these conditions, the threatened states will strike a hard and soft balance. Based on non-military and power-containment components, states employ soft military (e.g. selling arms to an enemy rival without entering into military alliances) and non-military balance (adopting economic restrictions and sanctions) to weaken the relative power and reduce the strategic efficacy of the dominant state. In hard balance, however, the threatened states try to form a coalition to alleviate the power of a superior country in both military and non-military forms (e.g. strategic economic aid and technology transfer) (Chegnizadeh, 1392 [2014 A.D.], pp. 234-235).

Unlike other balance of power theorists, John Mearsheimer emphasizes balancing acts and strategies to explain a political unit's strategic behavior. His explanation of the reason behind competition between great powers and their effort to hegemony over others originates from the following five basic assumptions: An anarchic international system, offensive military capabilities of states for damaging others, uncertainty about the intentions of other states, self-preservation, political sovereignty, increasing security as the primary objective of all states, and the intelligence of great powers. Hence, he believes that large states seek to maximize their share of global power or achieve the following four goals: hegemony over one's own region and preventing rivals from dominating other regions, maximizing their share of global wealth by creating prosperity that can be turned into military power, dominating territorial balance as a precondition for maximizing military power, and ultimately having a nuclear advantage over

their competitors. These goals are achieved through the following four power acquisition strategies: War, intimidation and extortion, laying conflict traps for rivals, bloodshed, and two containment strategies: Balancing and shifting responsibility to others. Mearsheimer criticizes the final two strategies, namely appeasement and following. He believes that the anarchic international order incentivizes all nations to gain maximum power and expansionism. Even with two great powers in the international order, the rival elimination incentive endures and countries will seek to upset the balance of power in their favor in a continuous rivalry at all times and places. In the balancing strategy, a great power takes direct responsibility for stopping an aggressor from upsetting the balance of power, resorting to war in the event of failure. For an effective balancing strategy, Mearsheimer proposes three strategies: First, diplomatic threats against the aggressor and sending clear messages about the possibility of confrontation, and second, forming a defense pact with several states to distribute the containment cost (also called hard external balance). This approach is slow; it leads to disagreement on cost distribution, and shifts responsibility to others. The third strategy consists of mobilizing internal resources and tapping new resources for a quantitative and qualitative military or economic edge to raise national power, also called hard internal balance. As the purest form of self-help, states are seemingly always trying to establish balance from within (Mearsheimer, 2001, pp. 138-157).

3.The Nature, Types, and Applications of Artificial Intelligence

3. 1. Definition of AI

Artificial Intelligence (AI) is a powerful and practical computational technique of recent decades in various sciences.

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Historically, it has had four different definitions, and there is contention among scholars. Certain scholars have defined AI as "a system thinking rationally", some as "a system behaving rationally", some as "a system thinking like humans" and some as "a system behaving like humans" (Russell & Norvig, 1995, pp. 4-5). John McCarthy defines AI as "the science and engineering of making intelligent devices." He believes that instead of obtaining a specific type of intelligence with human characteristics, AI systems had to be designed to solve problems that the human brain could also solve (China AI Development Report, 2018, p. 9). UNCTAD calls AI "a machine's ability to perform cognitive tasks normally done by the human brain" (2021, p. 17); and the Organization for Economic Co-operation and Development defines it as "a machine-based system that can influence a particular set of objectives set by humans, predictions, recommendations, or decisions, thereby affecting the real world" (OECD, 2019). More objectively, AI can be defined as non-human intelligence, examined according to its ability to imitate or simulate human cognitive skills, such as pattern recognition, natural language comprehension, adaptive learning from experience, creating strategies, or reasoning about others (DeSpiegeleire, Maas, & Sweijs, 2017, p. 23). Overall, AI can be defined as an empowering technology with applications in various technologies, and an umbrella term for a diverse set of digital technologies for tasks normally requiring human intelligence (Zeng, 2021a, p. 1445).

3. 2. Types of AI

There are different classifications of AI. Certain scientists define weak and strong AI, while another classification mentions narrow

AI, general AI, and artificial superintelligence. Narrow or weak AI are limited digital technologies focused on specific tasks. This is the most elementary generation of AI operating below the human level and the current level of AI development (e.g. the iPhone's virtual assistant). General or strong AI is more advanced and has yet to be developed. This AI model learns how and what to think and will have cognitive abilities on par with human intelligence. The third type, artificial superintelligence, is still theoretical and represents the most advanced digital technology with superhuman consciousness (Zeng, 2021a, pp. 1445-1446). Hintze presents another AI classification with four categories: reactive machines, limited memory, theory of mind, and self-consciousness. Reactive machines use memoryless computation and cannot draw on past experiences for the future, instead choosing a strategy by checking their own and their rival's moves. Limited memory is used in intelligent cars, allowing systems to make decisions based on past experiences. The theory of mind is a type of AI that can express mental states, such as the objectives, desires, and beliefs of itself and others, recognizing that intentions, beliefs, and desires affect the decisions of others. The last type of AI, self-consciousness, also does not yet exist. It has its own feeling and consciousness, and can understand its current situation, use environmental clues to understand the feelings of others, and make decisions (Aryal, 2018, pp. 8-9).

3. 3. Applications of AI

The present applications of AI are very extensive. There are various core AI technologies, such as deep learning and machine learning, natural language processing, computer vision and image recognition, facial expression control, personal assistants,

intelligent robots, conscious computers, and conversation translators. However, AI applications can be summarized as the integration of information, tools, and services. Regarding information collection, integration, and analysis, AI systems include search engines, emotion analysis, speech and handwriting recognition, news classification, spoken language comprehension and interface, weather forecasts, stock market analysis, and health monitoring. In terms of practical tools, AI systems are used in face recognition, games, spam filters, software testing, derivatives training, automated penetration testing, machine translation, medical diagnosis, personal ethics analysis, hearing aids, robot movement, machine-brain interfaces, and presentation systems. AI services include targeted advertisement and customer classification, DNA sequencing, computer object recognition or vision, legal document search, biological data processing, and chemical analysis. AI can help by analyzing existing data in the evolution of state policies and correcting weaknesses (DeSpiegeleire, Maas, & Sweijs, 2017, pp. 44-46). Understanding the practical applications of expert systems and artificial neural networks highlights the importance of AI .

Expert systems are intelligent computer programs that apply information and inference methods to solve problems requiring human skills. They allow users to consult computer systems about a problem, its causes, and possible solutions. Since they are information-focused, these systems use different data types, novel methods, and explain their results. Their advantages include increased accessibility and reliability, reduced costs and risk, permanence, multiple experiences, explanatory ability, and rapid response. In all cases, they create an experience base and provide user training and easy knowledge transfer. The neural network, an

information processing idea inspired by the biological nervous system, processes information like a brain. This system is comprised of numerous highly-interconnected processing elements working together to solve a problem with human-like learning. Therefore, a trained neural network can be considered an expert on the data it receives and analyzes and answers "what if" questions. An artificial neural network is a powerful mathematical tool that can be organized to find data structure and predict an event's occurrence and magnitude based on evidence. The artificial neural network is used in risk analysis systems, unmanned aerial vehicles, quality analysis and testing, gas exploration, collision mitigation systems, loan risk estimation, spectral diagnostics, drug testing, industrial control processes, error management, voice detection, disease diagnosis, remote information retrieval, submarine mine detection, and 3D object, handwriting, and face detection (Sadeghi, Sohrabi Vafa, & Salmani,1393 [2014 A.D.], pp. 18-48). These AI capabilities clearly demonstrate how this general-purpose technology can lead to economic, diplomatic, military, and security progress, and why large global powers are competing in this scientific field.

4. Leading Countries in Artificial Intelligence

Most of the fundamental concepts in AI (AI) have developed from the insight in the fields of philosophy, mathematics, logic, theories of argument, physiology, and linguistics acquired over the past two thousand years. However, WWII and the research conducted during the war in the fields such as cryptography and computing firing tables for ballistic missiles led to its introduction as an independent scientific and applied field, which was influenced by the fundamental works of Alan Turing and research by Warren

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McCulloch and Walter Pitts on simple neural network. Finally, a small summer project in Dartmouth in 1956 gave birth to AI. On account of the Cold War, as well as the optimistic predictions of Dartmouth and its achievements from 1956 to 1974, the Defence Advanced Research Projects Agency (DARPA) allocated a large budget to AI projects at institutions such as MIT, Carnegie Mellon University, and Stanford on the reasoning that projects should be financed not the individuals. They assumed that machines can think, learn, create, and soon they will overtake humans. However, after a period of time, due to the failure in fulfillment of the promises of the scientists on account of technical limitations such as hardware limitations of memory and speed of processing, the publication of the book *Perseotrons* in 1969 by Marvin Minsky and Seymour Papert, which emphasized the limited function of the initial perceptrons of the Fusionism, as well as the disappointing reports regarding the failure of AI projects, the research budgets in the Europe and America, were deceased considerably from 1974 to 1980. After the ratification of the Mansfield Amendment in 1969 in the USA, all military budgets in this field were completely cut. Thus, the period from 1974 to 1980 is known as the winter of AI. However, expert systems, i.e., rule-based systems, emerged in the1980s. These systems provided responses to questions or solved problems within a specific field of knowledge; they were used as tools to support decisions makers and executive managers. The advancements regarding neural networks once again put a spotlight on studies in this field and resulted in allocating budget to these studies one more time. Japan allocated a budget to this 10-year project "Fifth Generation Computer Systems (FGCS)". This action resulted in a rivalry among the western governments and MCC Company in America and Alvey in England allocated budget to AI projects. In addition, DARPA tripled its research budget in this

field. However, the failure of the projects and drastic reduction of budgets from 1987 to 1993 brought about the second winter of AI. The only budget that was maintained was the military budget of projects that were directly related to the military fields, such as the program of the autonomous tank (which was never manufactured) and the DART battle management system, which were proved worthless in the first Persian Gulf War. From 1993 forward, AI researchers caused a paradigm shift and led AI on the path to the accomplishment of some of its 10-year goals. The studies as a direct application or downstream Spinoff technologies proved their application in a broad spectrum of different fields such as games, logistics, monitoring satellites and spaceships, robotics, traffic management, speech recognition, medical diagnosis, self-driving cars, also known as autonomous vehicles (AV), search engines, and in the military fields including drones. In light of that, in addition to the budgets of the private sector, the governments were inclined to invest in this field such that in the early 2000s, the European Union via the Seventh Framework Programme and America through the Grand Challenge and Cognitive Technology Threat Warning System started substantially financing of AI project. The effective combination of strong hardware, massive budget, relatively free development, plus large and labeled datasets led to significant achievements in this field (DeSpiegeleire, Maas, & Sweijs, 2017, pp. 31-38).

Nevertheless, Canada was the first country to publish its National strategy on AI in 2017, which is based on AI manpower, supporting the main innovation centers, scientific research, and the development of the country's position as the intellectual leader in the economic, ethical, political, and legal concepts (Pan-Canadian AIS, 2017). After Canada, China, Japan, Finland, and the United Arab Emirates published their national AI strategy in the same year

and announced their intention to be the leading countries in this field. The European Union, India, Mexico, England, Sweden, and Taiwan developed and published their strategy in 2018, Estonia, Singapore, the US, South Korea, Colombia, the Czech Republic, Lithuania, Luxembourg, Malta, Netherlands, Portugal, and Qatar in 2019, Indonesia, Saudi Arabia, Hungary, Norway, Serbia, and Spain in 2020. Furthermore, several other countries, such as Israel announced their AI strategy as well (AI Index Report, 2021, pp. 154-163).

The US as the main activist in the field of AI has commenced research and development from the emergence of this field. Accordingly, it has devoted a great effort to use AI to increase the operating effectiveness of armed forces and their standoff ability. The United States increased its AI budget by approximately 10 times from 2000 to 2016. Despite the overall decrease in military expenses in America, the number of its drones increased by approximately 65% from 2002 to 2013. The success of these systems has led to the development of the Unmanned Systems Integrated Roadmap, which is a roadmap to enhance the development of all types of autonomous unmanned aerial, ground, and marine vehicles up to 2038. In 2015, the Pentagon requested a 12-15 billion Dollar budget for 2017 to develop battle games and prove new technologies to preserve the superiority of America (DeSpiegeleire, Maas, & Sweijs, 2017, p. 83-87). In light of that, from 1996 to 2018, America has been a pioneer in the field of AI with 73773 AI journals and 28963 AI patents. In addition, the companies in the USA such as Google, Alphabet, DeepMind, Apple, IBM, and Microsoft are the main AI service providers. In a study on the number of AI specialists in 2019, among 15 countries in the world, the USA ranked second after China with 7465 specialists, followed by Japan. Even though the US holds the

second position in the field of research and the number of patents on the Internet of Things (IoT), American companies are the main IoT service providers. In regard to the research and development of big data, America ranked second with 14365 journals and ranked third with 1100 patents concerning big data patent, even though the American companies Dell Technologies, HP Enterprise, Alphabet, Amazon, IBM, and Microsoft hold the market of big data. In the field of Blockchain research, America is runner-up to China, although the American companies are the main Blockchain service providers. In the G5 research, the US holds the second position with 618 studies and holds the third position with 317 patents after the Korean Republic and the Republic of China. In the 3D printing, robotics, drones, gene editing, and nanotechnology in both fields of research and patent rights, the USA holds the first position, and in terms of solar photovoltaics, it is runner-up to India, which holds the second position. It holds the third position after China and Korea in regard to the patent right (UNCTAD, 2021, pp. 110-120). In accordance with the estimations of the data innovation lab in 2019, America ranked first in four categories, i.e., talents, research, development, and hardware (Castro & McLaughlin, 2021, pp 1-2).

After America, China holds the second position as the only country that globalized AI in its entire industrial ecosystem. During Hu Jintao's administration, by publishing mid-term and long-term national programs to develop science and technology (2006-2020) this country paved the ground for investment and development of AI, which aims at developing science and technology in China up to 2020. In April 2012, the Ministry of Science and Technology of China (MOST) published the 12th five-year plan for intelligent infrastructures. Industrial robots and IOT were introduced as the main technologies whose development can promote the international position of China. Furthermore, the plan of

implementing "Internet Plus", which was introduced in 2015, the 13th five-year plan of the Chinese government, the Robot Industry Development Plan (2016-2020), AI 2.0, the new generation of AI development plan, the Three-Year Action Plan for Promoting Development of a New Generation AI Industry (2018-2020) (Ding, 2018, pp. 8-9), and Xi Jinping's speech in the opening of the 19th Congress of the Communist Party of China, the foundation and introduction of AI as a way of increasing the economic productivity are all indications of this country's determination to hold the lead in this field. However, the targeted focus of the policy-makers of this country on this technology commenced with AlphaGo's triumph over Lee Sedol in March 2016. It increased the enthusiasm toward AI in China overnight and laid the foundation to develop various strategies in China in this field (Roberts et al., 2021, p. 59). In this regard, in July 2017, the State Council of China announced the development plan for the next generation of artificial intelligence, which was a comprehensive and comprehensive strategy, which announced the development of artificial intelligence in three stages. In the first phase, China was trying to reach the West by 2020. In this regard, China's artificial intelligence industry with a gross production of 22.5 billion dollars is next to the most advanced artificial intelligence industry in the world. In the second phase, China aims to achieve global leadership in some areas of artificial intelligence with a gross industrial output of $ 60.3 billion and a gross industrial output of artificial intelligence of $ 754 billion by 2025. Finally, in the third phase, China seeks to become the world leader in artificial intelligence by 2030 with a gross industrial output of $150.8 billion and a gross industrial output of artificial intelligence of $ 1.5 trillion (Ding, 2018, p. 10). Having taken these measures, China was able to obtain the leading position in several fields related to AI such as

related jobs, IoT, big data, Blockchain journals, G5 journals, and solar photovoltaics. It now holds the second position in terms of journals, patent rights, robotic journals, drone journals, 3D printing, and nanotechnology. China holds a lower position than its rivals concerning the invention of robotics, drones, gene editing, and solar photovoltaic journals. However, the Chinese companies hold the leading position in the PV market, and in total, they hold the second global position in AI (UNCTAD, 2021, pp. 110-120). Japan, South Korea, India, Singapore, Russia, Israel, England, and the European Union have made considerable progress in various parts of AI. However, they have a quite long way ahead to reach the two pioneer countries in AI.

5. China's Artificial Intelligence Technology and Changes in the International Balance of Power

As previously discussed, John Mearsheimer contends that under the anarchic conditions of the international system, governments may adopt one of the following strategies to repel the threat of aggressors: diplomatic measures, external balance (i.e. formation of a defense union or coalition with a group of governments to reduce the cost of curbing the aggressor), and internal balance (mobilization of internal resources and exploitation of new resources to improve the quantity and quality of military capabilities or achieve economic development in order to promote national power). In this regard, China takes advantage of several strategies to balance its relations with the US. After the death of Mao Zedong, the Former President of the People's Republic of China, the Chinese influential developmentalists attempted to raise China’s national power by emphasizing internal institutional changes and redefining the rules in some areas, such as foreign

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policy. Chinese politicians also sought to provide a safe environment in this country to achieve economic development, while protecting political sovereignty, territorial integrity, and independence of China and refraining from interfering in the internal affairs of other states. Some of the measures taken by the Chinese government in this regard are as follows: making a shift from a planned economy to a market economy, renovating China, adopting a policy of open doors and modernizing economic structures, achieving new areas of science and advanced technologies by establishing relations with major powers and developed countries, engaging in win-win game in foreign relations, adopting a policy of "good neighborhood" for peaceful coexistence with other states, improving China's image in international public opinion, converging into the global economy and promoting the slogan of globalization to attract new trade and investment opportunities for China and increase participation in international tenders, reassuring the international community and neighbors that the emergence of new China will pose no danger to them, taking advantage of strategic opportunities to improve relations with neighbors and the global great powers in order to create further wealth for the Chinese community, expanding and developing the trade and export of Chinese goods to conquer global markets and encourage the private sector, attracting foreign investment, ensuring the national energy security and diversification by developing relations with countries possessing the greatest reserves of energy, cooperating with developed countries to gain managerial experience, achieving technological and scientific growth, increasing China's influence over countries of the Third World to win the lion's share of their domestic markets and supplying raw materials for Chinese industries, undermining the UN human rights resolutions and isolating Taiwan, and

cooperating with regional and international organizations in order to expand China's influence over these regions and promote its position in the global economy (Jahangiri & Saei, 1398 [2019 A.D.], pp. 72-78).

In other words, Chines elites emphasized that international authority and domestic prosperity can be achieved through a combination of export-based economic development and constructive international relations, especially with the great powers (Daheshiar, 1397 [2018 A.D.], p. 7). Considering their "backwardness" advantage, China attracted a significant capacity of modern technologies through special economic zones, foreign direct investment, joint ventures, licensing processes, and scientific cooperation. As a result, this country achieved an economic growth of 10% from 1978 to 2015, which is considered unprecedented in the history of the great powers. In fact, China managed to adapt the technological achievements of the developed countries, which were attained over a century, to its competitive advantages in a short period (four decades) at the lowest cost. This helped China to achieve industrialization in a short time and approach the boundaries of innovation, as this country was known for its creative and innovative economy (Bahrami Moghadam, 1399 [2020 A.D.], pp. 241-256). Accordingly, China is on the track to turning into a developed economy and a full-fledged member of the global economy; it also aims to play a leading role in the management of international economic institutions (Yifulin & Svejnar, 2021, p. 20). Viewing the international financial order as a tool to challenge the US hegemonic power, China seeks to undermine the US position to gradually develop a new international economic order, which is mainly led by China (Mirtorabi & Keshvariyan Azad, 1399 [2020 A.D.], p. 141-163). However, a major problem that China faces in its way to economic development is that the full use

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of the existing capital and workforce by a government aiming at economic growth and development can basically slow down or stop the growth rate of that country. This means that the economic growth of a country almost stops when it reaches the boundaries of production factors, unless it can use technological innovation to achieve continuous economic growth based on the same facilities. A major problem for China's economy is the high average age of labor. Moreover, the highest economic growth rates in this country have been dependent on labor-based industries, rather than capital- or knowledge-based industries, similar to the US economy. Therefore, artificial intelligence (AI) can act as a driving force for sustainable economic growth and meet GDP targets in this country. For example, partial replacement of the workforce with automated machines or robots, learning consumer choice models, selecting and positioning the target markets, adoption of the best production, distribution, and marketing strategies, and AI-based prediction of production and consumption rates can improve economic diplomacy and ensure the continuous economic growth in China. In addition, evolutionary algorithms, such as genetic algorithms, colonial competition algorithms, and particle swarm optimization can be effective in dealing with internal and external economic problems, which may require several different possible or impossible solutions, and also provide more realistic predictions. Moreover, Fuzzy logic can reduce errors, ambiguities, and uncertainties in the evaluation of many economic problems that governments face today, such as total factor productivity. However, the effective functioning of AI and its branches depend on several factors, such as easy access to large amounts of valuable data, recruitment of talented human resources in AI areas, multiplicity of computational resources, encouragement of organizations to effectively adopt AI, cooperation between the government and the

private sector, and public opinion desire (Horowitz, Allen, Kania, & Scharre, 2018, pp. 5-6). The Chinese government has taken advantage of the state media to both highlight the positive applications of AI and attract support from public opinion. Moreover, unlike the US, the Chinese government has good cooperation with private companies and national champions in the AI field, resulting in the collection of massive data from one billion mobile phone users in China. On the other hand, because of the positive performance of the Chinese government, the middle class in this country does not expect the government to do something special for them and is not willing to challenge the government in various areas. Chinese business people and merchants have also realized the coordination between their own interests and those of the government. As a result, they try to cooperate with the government, rather than of challenging it (Dreyer, 2016, p.196). These elements have made it possible for China, unlike many other countries, to have access to significant data from its population, which accounts for a large part of the world's population. Such data are of vital importance in machine learning. As a security measure, China's central government has labeled Al to persuade local governments, market players, intellectuals, and the general public (Zeng, 2021b, p. 26). In addition, the "Data Security Act", approved by the Chinese government requires all Chinese companies and institutions to receive government authorization before providing any information about the Chinese government and people to international institutions and agencies (Bode & Huelss, 2021, p. 6). This strategy aims to prevent competitors from gaining access to this valuable product. After observing China's progress in AI-related areas, the US banned the sale of IBM's powerful Xenon processors to Chinese projects in April 2015. Nevertheless, China managed to replace them with domestic

processors in the Sunway Taihulight, which has been considered the world's fastest supercomputer since 2016 (DeSpiegeleire, Maas, & Sweijs, 2017, p. 77). Although private companies based in Silicon Valley, the US, today outperform China's private AI companies in some areas, such as the number of top talents, the Chinese government attempts to take a rewarding and accelerating approach to the smart data generation and support Chinese private AI companies in order to educate a group of talented and committed engineers who can change the global AI game to the favor of China by interacting with the government and utilizing the abundant data and machine learning in various aspects of the domestic and international economy. An important point here is that AI technology can a barrier to taking advantage of comparative advantages, because this technology can grow so quickly that the intellectual property rights in leading countries do not allow other countries to make use of their experiences at the lowest cost possible.

China's military policies also indicate that Chinese leaders attempt to modernize the military forces of this country to increase domestic capabilities and diversify strategic options by establishing relations with advanced countries in AI areas, such as Israel and Russia, in order to balance the US power. In this regard, China has banned the military from engaging in economic activities since 1998, on the one hand, and increased the army's budget and modernized the military forces by purchasing advanced weapons from its allies as well as domestic manufacturers, on the other hand. According to the 2006 China's Defense White Paper, the military power of this country was planned to be modernized in three stages: establishment of a firm foundation for military modernization (until 2010), rapid progress in modernization (from

2010 to 2020), and establishment of an IT-based military force, capable of winning potential digital battles in the mid-21st century (from 2020 to 2030). This white paper mainly aims to increase China's military capability in all areas in order to be a superpower in half a century. Accordingly, the Chinese Navy, which is traditionally known as the main weakness of China's armed forces, should be strengthened because of China's dependence on energy and the transportation of goods and raw materials by seas and oceans. Additionally, extensive investments have been made in China's aerospace program (Chegnizadeh, 1392 [2014 A.D.], pp. 249-255). However, AI is considered a special technology; as stated by Zeng Yi, a senior executive at China's third largest defense company, "AI will bring about a leapfrog development." Accordingly, China's Ministry of National Defense established two major research organizations in 2018 under the auspices of the NUDT to focus on AI and unmanned systems (Allen, 2019, pp. 7-8). The Chinese military's approach to AI is actually determined by the US advances and projects in this field. In other words, China is willing to invest in technologies, of which the Pentagon has taken advantage to achieve its military superiority. Self-driving vehicles, robotics, and blockchain are few examples of such technologies, which have both military and commercial applications and the US attempts to prevent their export to China through the Wassenaar Arrangement. Nevertheless, the Aviation Industry Corporation of China (AVIC) has discovered the key components of the production chain of the US military aircrafts, and the Chinese semiconductor industry is now supplying many of the chips needed for maintaining and repairing old equipment of the US military aircrafts (Sheykholeslami, Salami Zavare, & Fallahi Barzoki, 1398 [2019 A.D.], pp. 111-120). To compensate for its naval weaknesses, China has invested in and tested unmanned vessels.

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On the other hand, this country has managed to achieve remarkable advances in steering and controlling unmanned aerial vehicles (UAVs). Additionally, to improve its defensive power against the US semi-automatic long-range anti-ship missiles (LRASMs), China is interested in the application of AI in the flight guidance and target identification systems of its new generation of cruise missiles. This initiative can improve the operational capacity of China's army to perform various missions; it also allows the Chinese military commanders to reconfigure the missiles depending on the battlefield conditions. Chinese officials hope that the measures taken in this regard help them to realize their "remote warfare" doctrine, aiming at organizing a large fleet of small vessels attacking and dispersing in a way that the US naval defense systems would fail to thwart their attacks (DeSpiegeleire , Maas, & Sweijs, 2017, pp. 77-79). Thanks to AI, cyberspace is another important area of competition in the new era. Divided into offensive and defensive, automated cyber systems can be even more dangerous than lethal automatic weapons because they are gradually turning into a reality in today's world; they can quickly influence the entire world and reproduce themselves (Delerue, 2020, pp. 159-161). Therefore, because of its importance in the US national security, economic prosperity, and supremacy, superiority in aerospace and cyberspace, which requires significant investments, is considered a critical component of the US aerospace defense strategy (DSS, 2020). To strike a balance in this area, China has taken the necessary measures to achieve the 5G technology in a rather short period of time and undermine the US monopoly in this area (Zhao, Moritz, & Seal, 2021). This has made the US allocate more budget to these areas to maintain its supremacy in G5 technology. The importance of cyberwarfare lies in the fact that there is no international law to address these attacks

and, on the other hand, they can be counteracted similarly through cyberspace. As a result, if a country achieves more advances in AI, it can recruit its AI elites in order to engage in cyberwarfare to damage another country's vital systems and infrastructure and change the balance of power in its own favor without the need for physical war or bloodshed.

It generally seems that the People's Republic of China has recognized the importance of AI from the early 20th century and attempted to utilize this technology to increase its share of the global structure of power and, thereby, challenge the internal balance of power in the US. This country has also sought to join other regional nuclear and AI powers, including Russia, to establish a multipolar order and reduce the US involvement in the Asia-Pacific region. As the US hoped to curb China through the liberal international order, it had never impeded China's progress resolutely and practically over the last four decades. Nevertheless, the US has taken some measures, such as selling arms to Taiwan, concluding international contracts (e.g. the Wassenaar Arrangement), and forming strategic alliances with India, Japan, and South Korea, in order to balance China's power. Despite all the measures and actions taken against China, this country has managed not only to keep up with its AI advances, but also to overtake the US in certain areas. These achievements have made China hope that this technology can help to bridge the gap of power with the US.

6. Conclusion

This study employed Mearsheimer's balance of power theory to explain the effects of China's Artificial Intelligence advances on

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the international balance of power. It seems that People's Republic of China, similar to all the great powers discussed by Mearsheimer, is doing its best to further increase its influence over the surrounding region, i.e. Asia-Pacific, and reduce the US hegemony in this region. For this purpose, China has adopted a strategy of internal balance to strengthen its economic and military power. The development of Artificial Intelligence and its different branches, such as machine learning, natural language processing, machine vision, robotics, neural networks, evolutionary algorithms, fuzzy logic, and expert systems, can help this country to achieve these goals easier. For example, in economic areas, this technology can ensure the sustainability of China's economic growth and productivity by increasing the quality of domestic products as well as accuracy in economic analyses, decisions, and forecasts. Therefore, as Mearsheimer states, this process helps China take advantage of the created economic wealth to support its military power, raise internal satisfaction by increasing public welfare, and strengthen its political sovereignty.

Along with economic power, the application of AI in military equipment, such as UAVs, operational and commanderships decision-making, and defensive and offensive land, air, sea, space, and cyber operations can increase China's national power and change the international balance of power in favor of this country. Nevertheless, since this process will cause the global hegemony to incur hefty expenses, the rationality of Chinese elites seems to be an obstacle to the realization of China's aspiration of global leadership in the short term. Rather, they attempt to utilize AI to be a new leading nuclear power in AI, like Russia, in order to both challenge the US hegemony and establish a multipolar order, aiming at increasing its influence over the surrounding region. As a

result, the People's Republic of China has developed various plans and initiatives since 2006 to attract Chinese public opinion, AI elites, and public organizations and institutions and also further interact with private AI companies in order to achieve more advances in this area. Thanks to such wise measures, China has managed to obtain the world's first rank in some important AI areas. However, this country still falls after the US, in overall, and in some other areas such as the number of experienced professionals and the semiconductor industry. These great achievements of China in various areas of AI have provoked sensitivity and reaction of China's regional rivals as well as the US, as a hegemonic power, attempting to balance China's power and prevent its further successes in different ways. But it seems that if China can maintain its growing trend in artificial intelligence, despite all the pressures and constraints, and take the lead in artificial intelligence, it can build a new multipolar order alongside regional powers like Russia. That this could lead to further instability in the international system.

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