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RESEARCHARTICLE

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The Iranian Nuclear Power: Iranian Nuclear Program Between Ambition and Challenges

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Abstract
The Iranian nuclear program has occupied a prominent position on the international scene and has remained the subject of intense scrutiny and investigation as a result of the international community's concern over the purposes of this program. The Iranian nuclear program has witnessed many turning points and transformations since its inception over the decades, resulting in significant challenges whose impact was not limited to Iran's nuclear program only but expanded to reflect on Iran as a whole, especially its economic aspect, which in turn affected all areas of life in Iran. Therefore, this paper will explore the stages and challenges that the Iranian nuclear program has gone through since its inception, its secret work, and its global emergence. Besides, the paper will discuss the nuclear deal, which is called the Joint Comprehensive Plan of Action (JCPOA), and the challenges that emerged after that deal. In the end, it is clear from this paper that Iran has a great ambition to possess nuclear energy and develop its capabilities. On the other hand, this led to the rise of major challenges, whether during the stages of developing the Iranian nuclear program or after that, especially after the period of the nuclear agreement and the withdrawal of the United States during the era of United States President Trump.

KEYWORDS
Iran, JCPOA, Iran Nuclear Program, Nuclear Power, Iran Ambition.

1 | INTRODUCTION

Energy is the major and primary source in all areas of life, whether in industry, production, transportation, electric power generation, and others. Over time, the energy demand has increased, and it is expected in the future that the energy demand will increase at a higher and faster rate, especially in countries with developing economies, as they will need more power, which means an increase in demand for energy (Ali et al., 2023). After relying on energy sources from coal, gas, and oil, countries started to find new sources of energy, and they discovered nuclear energy as an alternative to improving energy efficiency and developing fuel cells (Eriksson, 2017).

Therefore, the world is starting to shift towards finding various alternative sources of energy to the previous traditional sources, and the most important of these new sources is nuclear energy, along with other sources, to fill the gap resulting from oil consumption, which will gradually deplete in the future (Martensonm, 2023). However, Despite the benefit of nuclear energy, whether in generating electric power or reducing pollution when used in generation operations, the risks outweigh that much, primarily if nuclear energy is used in the military field, nuclear weapons programs plus the manufacture of warheads, and the fears associated with military use because of its terrifying destructive ability (Kyne & Bolin, 2016).

For decades, states have raced to possess their nuclear programs, whether for peaceful or military purposes. Iran was one of the first countries to possess its nuclear program, and it was able to achieve this in the fifties of the last century. Iran made the first step in its ambitions to possess the nuclear program at that time (Kerr, 2019). The Iranian nuclear program has gone through several stages, ranging from starting with its origin to stopping or remaining, to hidden activity, and

sudden return and emergence. However, despite the Iranian ambition to possess and develop its nuclear capabilities, this had repercussions that negatively affected Iran, whether locally, regionally, or even internationally (Ashraf et al., 2024). Moreover, relations between Iran and other countries in the international community have changed between the fear of Iran obtaining a nuclear weapon and what Iran seeks to develop its nuclear program and its continued emphasis on the peace of its program. Furthermore, the Iranian nuclear program was a major factor in increasing tension in the Middle East region, which was characterized by its continuation, especially over the past two decades, which greatly affected Iran's relationship with the international community and led to instability in the entire region (Wang et al., 2023).

As a result, the Iranian ambition to possess its nuclear program and its strong insistence on continuing and developing it for peaceful and research purposes raised the concerns of the international community, especially the United States (Li et al., 2023). These concerns also increased over time due to the obsession with fear of the possibility of Iran developing its nuclear capabilities that could be used for armed uses and developing military nuclear capabilities. Consequently, the international community, especially the United States, began to take measures and procedures that limited Iran's development of its nuclear program, and these became major challenges to its progress. Hence, this paper aims to explore the Iranian nuclear program's history and the stages that led to it, in addition to discussing the challenges that hindered and limited Iran's ambitions regarding its nuclear program and capabilities (Li et al., 2023). Therefore, this paper is divided into four sections: Iranian nuclear program background, Iranian nuclear program phases, Iranian nuclear deal (JCPOA), and post-nuclear deal challenges.

2. Iranian Nuclear Program Background

Iran was not far from achieving its ambition to have a nuclear program of its own, like all other countries, and it has sought since the 1950s to achieve this. As a result of Iran's relations with the West at that time, represented by the Shah of Iran government, Mohammed Reza Pahlavi, plus his relations with the governments of the West, especially the United States, they succeeded. During the period of the Shah's rule, the nuclear program in Iran was civilian; its goal was to benefit from nuclear energy for peaceful purposes instead of using it to manufacture weapons, especially since the Iranian nuclear program at that time was subject to strict monitoring and supervision by Western countries (Eneyo et al., 2022).

According to Mousavian and Mousavian (2018), on March 5, 1957, Iran signed a cooperation agreement with the United States for the peaceful use of nuclear energy, and that was within the period of US President Eisenhower, who had presented the Atomic Program for Peace. Indeed, Iran received assistance related to its nuclear program, and the first nuclear facility was obtained from the United States, which is the Tehran Research Reactor, in 1967 (Mousavian & Mousavian, 2018a). During that period when Iran obtained the Tehran Research Reactor, Iran was one of the largest military powers in the region, and the Shah's goal for Iran to have a nuclear program was not to use it to develop military capabilities and produce nuclear weapons (Qader et al., 2022). However, Shah's thinking was long-term, as he was thinking about the future based on what regional security changes might occur, which might require Iran to possess nuclear weapons (Tabatabai & Dolzikova, 2019a).

Moreover, Iran's ambition continued to expand its nuclear program and developed a strategy for that. Shah Mohammed Reza Pahlavi proposed in 1973 a proposal to increase Iran's nuclear energy production to 23,000 megawatts, and the plan was to achieve this at the end of the twentieth century. Iran has signed agreements with several foreign countries related to nuclear activity on the peaceful side and its expansion in educating its employees on nuclear technology (Ishaque & Shah, 2017). After the Iranian Islamic Revolution in 1979 and the end of Shah's rule and Khomeini coming to power, Iranian plans and attitudes related to the nuclear program changed. As a result of the relations severing between Iran and the West after the Iranian Islamic Revolution, there was a break in the Iranian nuclear program (Dasgupta, 2018).

Indeed, Successive Iranian governments have emphasized over the decades that Iran's possession of nuclear capabilities is for purely peaceful purposes. Since the inception of the Iranian nuclear program during the reign of Shah Pahlavi, who dreamed that Iran would have a nuclear program for peaceful purposes, and the subsequent governments, even after the revolution, Iran's goal of its nuclear program is for research, energy, and other non-military areas of life (Epezagne Assamala et al., 2022). Even after Iran's nuclear program was revealed in 2002, which was secret, Iran strongly affirmed that its goals were peaceful. To confirm this and reassure the international community, the Supreme Leader, Ayatollah Ali Khamenei, issued a fatwa banning the use of nuclear weapons (Keynoush, 2022).

The Iranian nuclear program has passed through many different positions, from the start-up stage to the pause, to the sudden appearance in 2002, plus the challenges facing Iran and the fears of Iran developing its nuclear capabilities and possessing nuclear weapons began. With the passage of time and the development of events, the challenges facing Iran increased, and although their goal was to restrict and limit Iran's nuclear

capabilities, they affected Iran in various fields in a significant way.

3. Iranian Nuclear Program Phases

This section of the paper will explore the Iranian nuclear program's phases as it has gone through several phases from its inception until today. These phases were aligned with events due to regime change, whether in Iran or in the countries with which Iran had a strong relationship, which led to a change in the relationship between Iran and those countries (Shahzad et al., 2021). Hence, these changes significantly affected the Iranian nuclear program. When the Iranian-Western relations were strong, the Iranian nuclear program arose, but the changes that occurred in the regime in Iran led to a disconnect in the relations between Iran and most of the Western countries; as a result, the course of developing the Iranian nuclear program transformed, and it witnessed a pause. Hence, this section will explore the stages of the Iranian nuclear program through four phases, as below.

3.1. Foundations Phase 1957-1979

Iran's interest in nuclear energy dates back to the fifties of the last century, to be used for peaceful purposes, especially in the generation of electric energy. Indeed, the discussions began between the United States and the Iranian government under the rule of Shah Mohammad Reza Pahlavi in 1955. After that, in 1957, they reached a cooperation agreement to develop Iran's nuclear program (Butt et al., 2019). It was part of the United States "Atom for Peace" program, which supposedly provides nuclear assistance to a group of countries that agree not to develop nuclear weapons programs in the future, in addition to international control over those nuclear activities (Pedraza, 2015). Moreover, in 1967, Iran obtained a nuclear research reactor, the Tehran Research Reactor. The capacity of the reactor was 5 megawatts. Then, Iran signed the Nonproliferation Treaty in 1968 and ratified it in 1970 to ensure that Iran was then assuring that its nuclear program was for peaceful purposes only (Samson & Ogbeidi, 2015). Therefore, Iran's signing of these treaties is nothing but its initiative and confirmation of its keenness to use its nuclear program for civilian purposes only, and its goal is not armed or to develop and build military capabilities or nuclear weapons (Li et al., 2020).

Furthermore, in the seventies of the last century, Shah Pahlavi continued his ambition to develop and expand Iran's nuclear program in the peaceful field. His goal was to produce 23,000 megawatts in the electricity sector, and the plan was in place for 20 years. Iran has signed contracts with various international companies to build nuclear power stations, train workers in the field of nuclear energy, and build light-water reactors relying on American companies and reactors by France and Germany. Besides, Iran has sought to obtain nuclear fuel and has established investments with an alliance consisting of France, Italy, Spain, and Belgium to enrich uranium (Barzashka & Oelrich, 2012). In 1976, Iran spent one billion dollars on buying 10% of a uranium enrichment plant in France and 15% from Namibia. It allocated 700 million dollars when it signed a contract with South Africa to buy uranium yellowcake in addition to sending technicians for training in nuclear technology outside Iran (Pedraza, 2015).

Iran's ambition continued to grow during that period; it signed an agreement with the United States in 1978 that included the sale of United States nuclear reactors to Iran operating in light water, the reprocessing of plutonium in the United States under its provisions, and its export to Iran according to strict restrictions (Barzashka & Oelrich, 2012). The period of Shah Mohammad Reza Pahlavi was the period of thinking, emerging, obtaining, and developing the Iranian nuclear program and the realization of the dream of possessing nuclear technology. Iran succeeded in that and achieved the early stages of it for nearly two decades that lasted from the fifties of the last century until the end of the Shah's rule in 1979.

3.2. The Resting and Rearranging Phase 1979-1989

After the revolution in 1979, the end of the rule of Shah Muhammad Reza Pahlavi, and the arrival of Khomeini to rule, a significant change occurred in the course of Iran's nuclear program. Khomeini, since he arrived in the government, has opposed the possession of any chemical and nuclear weapons, even if they were used for defensive purposes against any threat to Iran, stressing that such a type of weapon violates and opposes the principles of humanitarian rules (Khomeini, 2018).

According to Vaez & Sadjadpour (2013), the Iranian nuclear program has stopped since Khomeini came to power, ordering the suspension of work at all nuclear stations and ordering the conversion of the unfinished facilities to wheat storage silos. All agreements related to the nuclear program have been terminated. On the other hand, the Western countries and the United States refused to complete the deals concluded with Iran (Mangenda Tshiaba et al., 2021). The nuclear technology-related apparatus was not handed over, despite the Shah's government paying its high price. In addition to the strained American-Iranian relations after the American embassy incident in Iran and the detention of American diplomats for 444 days, The United States stopped supplying Iran with enriched uranium. Consequently, the Tehran research reactor was temporarily closed (Vaez & Sadjadpour, 2013).

Further, in 1980, the Iran-Iraq war started, which lasted for eight years. Iran changed its defense plans and again sought to reactivate its nuclear activities in the mid-1980s to increase its defense forces. Iran intensified searches to obtain uranium from new destinations instead of Western countries, which in turn refused to provide support to Iran. Also, Iran worked to return Iranian nuclear scientists who had previously been exiled abroad to benefit from their experiments in place of the countries that refused to assist them (Bahgat, 2006). In 1985, Iran signed a long-term nuclear cooperation protocol with China to obtain expertise related to the nuclear program by training Iranian workers in China. It also signed another nuclear cooperation protocol with Pakistan in 1987 (A. M. Tabatabai & Dolzikova, 2019b).

Khaled and Hashemi clarify that Iran has restarted the Bushehr reactor, relying on local expertise and without obtaining any external support. However, in 1987, Iran obtained several technical drawings and plans for P-1 centrifuges from Dr. Abdul Qadeer Khan (Khalid & Hashmi, 2014). Moreover, In the same year, after several discussions, Pakistan agreed to conclude an agreement with Iran regarding Iran's nuclear program. The agreement included that several Pakistani nuclear institutes train Iranian nuclear scientists, such as the Pakistani Nuclear Science and Technology and the Nuclear Studies institutes, where the latter institute received 31 Iranian nuclear scientists. These scientists got training in many essential parts involved in weapons production processes, the most significant of which are the plutonium extraction process and the uranium enrichment process (Rezaei, 2017a).

Therefore, Iran faced a challenge represented by Western countries severance their relations with Iran, which affected the development of Iran's nuclear program. However, Iran overcame this challenge by relying on the experiences of other countries in working to develop its nuclear program. Iran did not stop at the point of relying on other countries such as Pakistan but rather achieved a new step in the field of Iranian nuclear energy, which enhances the work of Iran's nuclear program in the future, which is the development of local expertise working in the nuclear field, which is considered a vital step with several dimensions, the most significant of which is Iran's preservation of the secrecy of its nuclear program, which it makes Iran influential in the international arena, especially the regional one. Also, the other dimension is not to be frightened of Western challenges and to overcome them after the severing of relations between Iran and Western countries and to overcome this challenge, as the local expertise will develop and continue the Iranian nuclear program, which does not pose a threat like the Western countries that stop support for any reason. Furthermore, this has another important dimension, which is not to subject Iran in the future to any pressure that external sources with nuclear expertise may use to subjugate Iran for any reason whatsoever.

During this phase, the nuclear program witnessed a period of stagnation, represented after Khomeini reached power and his rejection of any form of nuclear work. However, during the fighting intensification in the 1980s with Iraq, Iran worked to revive its nuclear program despite its emphasis on its peaceful purpose. However, its military leaders sought to obtain nuclear technology to keep pace with developments in the military fields and increase their defense strength, and thus, they reworked their nuclear program.

3.3. The Acceleration And Development Phase 1989-2002

This stage witnessed a change in the Iranian nuclear program. After the end of the Iran-Iraq war and Khomeini's death in 1989, Ali Akbar Hashemi Rafsanjani came to power, and he stayed for two presidential terms (BBC, 2017). Since his arrival to power, Rafsanjani has continuously sought to revive Iran's nuclear program through a series of measures to achieve this. Initially, he focused on Iran's right to possess nuclear capabilities for peaceful purposes.

In addition, Rafsanjani was able to achieve deals with other countries instead of the United States and succeeded in doing so with China, Russia, North Korea, and Pakistan. Also, he worked to fill the void of skills and experts by relying on local expertise through two things. The first is to encourage the return of Iranian scientists and experts who immigrated outside Iran after the revolution, motivate them to return to Iran and settle there, and provide them with lucrative benefits to achieve this. The second is to develop local Iranian skills by sending hundreds of Iranian scientists and engineers to Russia to train them and acquire skills in its advanced nuclear institutes (Hussain, 2022).

Rafsanjani supported the beginning of nuclear research in Iran and the revitalization of its nuclear program, whether to support electricity or development and post-Iranian Iraqi war reconstruction. He made revitalizing and building Iran's nuclear program a priority for the Iranian government and emphasized the importance of the program to Iran's future. The government, whose chief was Rafsanjani, has begun several additional steps to revitalize and support Iran's nuclear program. In 1990, a laboratory for teaching nuclear technology opened; in 1991, Iran announced that the Iranian Atomic Energy Organization would undertake nuclear cooperation with any country and that China and Russia were the first choices due to the absence of relations with Western countries. Then, in 1992, the first master's degree course in nuclear engineering was opened (Patrikarakos, 2012).

According to Khlopkov & Lutkova (2010), Russia and Iran signed an agreement in 1992, the purpose of which

was to build a nuclear power plant in Iran. The agreement included the building and operation of the plant, with its expansion and extension two units later. In 1995, Russia and Iran signed an agreement to complete the first reactor unit, the Bushehr reactor, which was suspended for a long period, and Russia completed its implementation after Germany stopped completing its work in that reactor, in addition to the deal to import nuclear fuel for ten years (Khlopkov & Lutkova, 2010).

Moreover, the cooperation was not only with Russia, but Iran also cooperated with China; it signed a secret nuclear agreement in 1991 to import materials related to nuclear activities, but without informing the International Atomic Energy Agency (IAEA). In the 1990s, China played an important role in developing Iranian nuclear expertise. They trained and assisted Iran in researching and exploring uranium. Also, it played a prominent role in training Iranian workers in the nuclear field. It trained engineers and technicians and increased their nuclear expertise, which expanded Iran's work and activity in the nuclear field, in addition to its assistance in establishing nuclear facilities such as the Isfahan Center for Nuclear Research (Harold & Nader, 2012).

Albright and Stricker (2012) explained that in 1999 and 2002, Iran tested centrifuges and used UF6 obtained from China, and that was also a secret. In 2001, Iran began secretly building a vast underground enrichment facility; Iran announced none of these events, and the IAEA was not aware of it (Albright & Stricker, 2010).

In the end, this stage was the stage of reviving the Iranian nuclear program, and it was very important, so the procedures were in an extremely secret manner. It is the stage in which many influential changes occurred, whether locally or internationally, which affected the Iranian nuclear program. On the local level, it is the stage that followed the pause that the Iranian nuclear program went through as a result of the Islamic Revolution that ended the Shah Pahlavi rule, the arrival of Khomeini to power, and the repercussions that followed that period. Internationally, Western countries severed their relations with Iran after the revolution, which led to the refusal of Western countries' cooperation and the termination of technical support necessary for the Iranian nuclear program. Therefore, Iran is obliged to find alternative solutions to revive its nuclear program to avoid any challenges that hinder the return of the Iranian nuclear program to work. Iran did not stop throughout that period to develop its nuclear program, whether from the necessary facilities, materials, technological equipment, or even expertise.

3.4. The Internationalisation Phase After 2002

After Iran carried out activities to revive its nuclear program in the previous period secretly, the surprise came to return to the international scene, its nuclear program. On August 14, 2002, at a press conference, Ali Reza Jaafarzadeh, deputy representative of the National Council of the Iranian Resistance in Washington, disclosed information related to Iran's nuclear program, the disclosure about Iran secretly producing nuclear material in two nuclear facilities, Natanz and Arak, which works with heavy water (Rezaei, 2017b).

After this information announcement, the Iranian nuclear program began its stage, and a new challenge was represented by the international community's concerns about the purpose of the Iranian nuclear program. If Iran's use is for peaceful purposes, as Iran previously claimed and still claims, whether in the field of electric power generation, commercial purposes such as selling nuclear fuel to countries that have nuclear fuel stations, or for research and medical purposes, why did hide it for a very long time, not to report it to the international community or IAEA.

Moreover, the challenge appeared when these questions arose, and countries began to accuse Iran of its purpose of secretly developing its nuclear program to manufacture and possess nuclear weapons and to use nuclear technology to develop and possess nuclear weapons. Diplomatic efforts began to restrict and control Iran's nuclear program to prevent it from acquiring any nuclear weapon. In 2003, discussions began between Iran and EU3 (Britain, France, and Germany), and Iran agreed to an agreement as an expression of its goodwill and the peacefulness of its nuclear program. In the year 2005, Iran submitted to EU3 additional proposals that included several things to restrict the Iranian nuclear program and confirm Iran's goodwill from using it for non-military purposes. However, these talks and suggestions failed and did not reach a satisfactory result or support the continuation of its nuclear program without problems (Mousavian & Mousavian, 2018b).

Further, in 2006, the Iranian nuclear program faced new challenges. Iran's nuclear file reached the United Nations Security Council (UNSC). Between 2006 and 2008, the UNSC issued four resolutions related to Iran's nuclear program. In 2006, The UNSC Resolutions 1696 and 1737 affirmed Iran's lack of cooperation and its lack of commitment in decisions related to building the confidence that supports the peacefulness of its nuclear program. Because Iran resumed uranium enrichment, the seriousness of its missile program, and the failure to fulfill its obligations, multiple sanctions have been imposed that include stopping the supply of nuclear technology-related materials from countries to Iran in any way, and not assisting Iran financially, technical or even training nuclear workers (UNSC, 2006).

In addition, in 2008, the UNSC passed resolutions 1803 and 1853 as a result of Iran's lack of commitment to and continuation of its activities in the nuclear program, whether uranium enrichment or the usual treatment of fuel or heavy water-related projects, in

addition to non-cooperation with the IAEA; hence, it has increased the severity of previous sanctions. It included restrictions on people named in those decisions and stressed not dealing with them or allowing them to travel, in addition to placing severe financial restrictions and restricting the movement and inspection of cargo destined for Iran (U. S. Council, 2008).

For several years, the IAEA and several intelligence services conducted intensive scrutiny of Iran's nuclear activities and discovered extensive and important information about elements related to the nuclear weapons program. In November 2011, the IAEA announced the results of its investigation, which concluded that Iran was carrying out an organized program until 2003, through which it carried out activities to develop an explosive nuclear device and its serious concerns about the possibility that Iran's nuclear program might have military dimensions. Besides, in 2015, the IAEA reiterated and confirmed in its final assessment that Iran, before 2003, carried out organized and systematic operations to possess nuclear weapons. However, these operations did not go beyond conducting a feasibility study and carrying out scientific studies to gain technical expertise in this regard (Arnold et al., 2021).

Further, after imposing sanctions on Iran, secret talks began between Iran and the United States, and they reached their summit in 2013. Iran sought to decrease economic restrictions as a result of its suffering from sanctions; it had to resort to conversations with the international community to overcome this crisis. These conversations were a turning point and a new start in Iran's nuclear file internationally, and Iran began to move towards openness and cooperation with the international community. During that period, many contacts took place, such as the meetings of the Foreign Minister of Iran and the United States and the exchange of telephone calls between US President Obama and Iranian Rouhani. These talks resulted in reaching an agreement on Iran's nuclear file, or what is known as JCPOA (Reuters, 2016).

In short, this stage is a fateful stage for the Iranian nuclear program, which has moved from the revival and secret activity accompanied by the challenges of filling the lack of expertise to the public stage revealed by the Iranian opposition, in which Iran must confront the challenges resulting from the repercussions of its secret nuclear activity, Which will undoubtedly lead to significant challenges for Iran that is not only reflected in its nuclear program but also all areas of life, its security, and stability.

4. Iranian Nuclear Deal (JCPOA)

This section of the paper will discuss the Iranian nuclear deal and the most prominent outcome that resulted from it. This deal has great importance regarding Iran's nuclear program, which is considered the basic foundation for the continuation of the Iranian nuclear program and helps Iran to avoid the challenges that could cause serious losses, whether in terms of its nuclear capabilities or terms of its stability in various fields.

According to Tabatabai (2017), a new stage began between Iran and the world powers regarding Iran's nuclear program, as negotiations resumed in 2012 after the imposition of sanctions on Iran. As a result of the problems they faced, Iran was obliged to go to the negotiating table. After years of intense discussions, the historical event that Iran had waited for him to reach a deal on its nuclear program came. On July 14, 2015, in Vienna, the agreement was signed between the Iranian Foreign Minister, Mohammad Javad Zarif, and the group of permanent members of the UNSC (China, France, Russia, the United States, and the United Kingdom) in addition to Germany or known as a group of 5 + 1. This meeting resulted in a deal on Iran's nuclear program or what is known as the Joint Comprehensive Plan of Action (JCPOA) (Tabatabai, 2017). However, the journey to reach a deal on Iran's nuclear program was not easy. It was a very difficult journey.

The deal came to severely restrict Iran in the nuclear field to limit and control its nuclear activity. Hence, the deal includes essential terms which required obliged Iran to:

- Remove all stock of uranium enriched by 20%.
- Remove 98% of low-enriched uranium 3.5%.
- Limiting the stock of low-enriched uranium to 300 kilograms for 15 years.
- Remove 14,000 centrifuges out of 20,000 from the Natanaz plant.
- Stop the enrichment process at Fordow station. Remove Calandria (core) from the Arak reactor and re-designed it to reduce its ability to produce plutonium that goes into the arms industry.
- Not reprocess spent fuel for 15 years.
- Not building heavy water reactors and has not stored heavy water for 15 years.
- Allow the IAEA to access and inspect any suspected site and control purchases of equipment for military nuclear activities for a period of 5 to 8 years to curb the expansion of Iran's nuclear program.

On the other hand, the deal recognized that most of the economic sanctions and decisions imposed on Iran due to its nuclear activities would be canceled. It also included the release of nearly 100 billion US dollars of Iranian revenues from the sale of oil abroad (Fitzpatrick, 2017).

According to UNSC resolution 2231 on July 20, 2015, the Iranian nuclear agreement was ratified, and its provisions were implemented, besides canceling the implementation of previous decisions issued to impose

economic sanctions and severe restrictions on Iran and the obligation of all parties to the terms of the agreement (U. S. Council, 2015).

However, despite the success of the nuclear deal at that time, it cost Iran huge losses and forced it to make many unexpected concessions that greatly affected its nuclear program and capabilities. On the other hand, these concessions were the only way to continue its nuclear program, reduce the extensive challenges to which Iran was exposed, decrease the restrictions imposed on Iran, and liberate it from the sanctions that greatly affected Iran.

5. Post-Nuclear Deal Challenges

This section of the paper will discuss the challenges facing Iran after the nuclear deal. Reaching the deal and approval by the UNSC does not mean ending the challenges and obstacles facing Iran. Two main challenges emerged, the first represented by the withdrawal of the United States from the nuclear deal after Donald Trump came to power and the result of that withdrawal, and the second by Israel's continuous opposition to and threatening to use military force against Iran.

According to Tabatabai and Dolzikova (2019a), United States President Donald Trump announced on May 8, 2018, his decision to withdraw from the Iranian nuclear deal, in addition to imposing a new series of economic sanctions against Iran, and that the nuclear deal must be modified to a new agreement, increasing restrictions on Iran and its nuclear program (Tabatabai & Dolzikova, 2019a). The main components of any nuclear program are fissile material, nuclear warheads, and ballistic missiles for the transfer and delivery of these nuclear warheads to their targets (Schwammenthal, 2018), and from this point constitutes the main reason for the United States' withdrawal from the deal, as the deal did not include or identifies Iranian ballistic missiles, development, and testing.

In 2018, Trump issued a decision to impose two sanctions phases on Iran to limit its nuclear activities, its military development, especially long-range ballistic missiles, destabilize security in the Middle East region, support for terrorist groups and malicious activities of the Islamic Revolutionary Guard Corps as he described (TRUMP, 2018). Sanctions came in two phases; the first phase applied on August 6, 2018, and included:

- Financial sanctions consisted of not allowing the Iranian government to buy or obtain US dollar currency and banning transactions in Iranian riyals.
- Banning the trade of gold and minerals such as aluminum, steel, and gemstones.
- Sanctions on the auto sector include banning the supply of auto parts for manufacturing to Iran.
- Sanctions on technology and software which are used in industrial processes.

This package applied for 90 days (USIP, 2018).

As for the second sanctions phase, which is the most severe, it applied on November 5, 2018, and it included:

- Sanctions on Iranian ports, operators, cargo ships, and their manufacture, including spare parts.
- Sanctions on oil and gas transfers.
- Sanctions on petroleum derivatives and petrochemical products.
- Sanctions on financial transactions of the Central Bank of Iran, banking institutions, and insurance companies.
- Sanctions on international financial transactions associated with the SWIFT system of money orders.
- Sanctions on individuals and entities related to the Iranian regime.

These sanctions have had a significant impact on the Iranian economy, followed by the collapse of the Iranian currency. Plus, the aviation sector is suffering from aging due to the inability to obtain spare parts to renew its planes and the cancellation of the purchase of new aircraft. Also, stop Iranian carpets sales to the United States, the inability to export many products, in addition to the decline in the auto industry. More importantly, its imports from the oil sector decreased, as it relied heavily on the export of oil and its derivatives.

Indeed, the purpose of all these sanctions is to curb Iran from its continuous pursuit of developing its nuclear program, developing its military capabilities, and reducing its influence and suspicious activities to destabilize the security and stability of the Middle East region. As for the second challenge to the Iranian nuclear program, it is Israel, as Israel considers Iran its first enemy in the Middle East and a threat to its security and seeks to destabilize the region.

Since the beginning of the Iranian nuclear program, Israel has called for it to be stopped in any way, even if it is military. According to Israeli Prime Minister Benjamin Netanyahu in 2012, he warned, during his speech at the United Nations General Assembly, that Iran is approaching in a significant way from acquiring a nuclear weapon. He made clear the danger of this by Iran overcoming many stages, which necessitates immediate intervention to stop that ambition (Heller, 2012). Moreover, Israel's opposition to Iran continued even after the nuclear deal and emphasized that Iran could continue to develop its capabilities, even if its activities were under surveillance. Israel has taken secret development as an excuse against Iran. Iran has developed its nuclear program for a long time without being discovered by the American, British, or even Israeli intelligence services. The process of development may continue in non-public but in secret places without revealing this, and the presence of centrifuges, even if they are few, can increase uranium enrichment faster, and therefore, the danger of a nuclear weapon still exists (Affairs, 2015).

Israel repeatedly reiterates its threat to use military force against Iran to halt its nuclear activities and even to destroy them, as it threatens its security and the security of the region as a whole. Fearing that Iran might develop its nuclear military capabilities and use them against Israel, it also calls on Israel to continually increase the severity of sanctions against Iran to weaken and dismantle the Iranian nuclear program. It became clear that Iran is facing significant challenges targeting its nuclear program through its economy, which has caused huge losses.

These challenges are continuing due to the continuation of the imposition of sanctions and even the expansion of them from one period to the next, in addition to the continuous pressure of Israel on the international community to dismantle Iran's nuclear program, which made Iran suffer and suffer huge losses due to its nuclear ambition.

6. Conclusion

Nuclear technology is a right for all countries of the world if they use it in peaceful fields such as electric power generation or research and medical fields, and Iran has the right to own this technology, but with conditions and restrictions that guarantee not to breach international security and peace. After the progress achieved through the Iranian nuclear deal, Iran felt relieved and believed that it had gotten rid of the international restrictions and sanctions imposed on it, but this was short-lived, as the United States withdrew from the nuclear deal and imposed very severe sanctions, which made Iran suffer from it in all sectors.

The Iranian nuclear program witnessed many challenges over the decades that followed its inception, and these challenges constituted serious obstacles that greatly affected the development of Iran's nuclear capabilities. Iran has been and still is constantly seeking to overcome the challenges it faces through solutions that overcome those challenges. Moreover, the challenges included many obstacles, most notably the lack of expertise working in the nuclear field after the end of Shah's rule as a result of the severing of relations between Iran and Western countries in general and with the United States in particular, transitioning to the stage of confronting international challenges after reactivating and reviving its nuclear program and challenging international powers and restrictions as a result of the withdrawal of the United States. United States from the nuclear agreement, in addition to Israel's continued challenge and continued threat to Iran

The challenges facing Iran, whether sanctions or the Israeli challenge, will make it more difficult for Iran to continue with its nuclear ambitions and to increase tension in the region in a significant way. It remains for Iran to make new attempts to negotiate to find a solution that removes existing tension and removes the challenges it faces by cooperating with the international community in a clear and frank manner regarding its nuclear program.

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