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TÜRK SAVUNMA SANAYİİNİN GELİŞİMİ VE 12. KALKINMA PLANI ÇERÇEVESİNDE HEDEFLERİ

THE DEVELOPMENT OF THE TURKISH DEFENSE INDUSTRY AND ITS TARGETS WITHIN THE 12TH DEVELOPMENT PLAN

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ABSTRACT

The foundations of the Turkish defense industry are based on the weapons factories that were transported from Istanbul and its surroundings to Anatolia during the War of Independence. In early years of the Republic, in addition to these, a number of factories relating to the defense industry had been established. With Türkiye's NATO membership, the Turkish defense industry had been in a period of stagnation; but the embargoes imposed on Türkiye following the Cyprus Peace Operation led to a realization of the importance of re-nationalisation. The Turkish defense industry, which has seen significant developments following the year 2000's, is experiencing a steady increase in the ratio of domestic production, and Türkiye is working to become a self-sufficient nation in this field. This study examines the development of the Turkish defense industry and its targets in the 12th Development Plan. The study aims to investigate developments in the Turkish defense industry and examine its development within the framework of the 12 th Development Plan targets. The research employs descriptive quantitative methods based on tables and graphs created using data from SaSaD and Presidency of Defense Industries. The findings reveal that the Turkish defense industry has experienced rapid growth since the first half of the 2000s, and that the resources allocated to research and development (R&D) expenditures during this period contributed positively to the industry's development. It was observed that the localization rate in Türkiye's defense industry is on an upward trend, Turkish uncrewed aerial vehicles (UAVs) and armed uncrewed aerial vehicles (UCAVs) have attracted significant global interest. Furthermore, the defense industry's turnover and exports are increasing, and its contribution to employment is on an upward trend. The data indicates that the Turkish defense industry can achieve the targets of the 12th Development Plan.

Keywords: *National security, military factories, Development of the Turkish Defense Industry, Targets of the Turkish Defense Industry.*

ÖZET

Türk savunma sanayiinin temelleri Kurtuluş Savaşı yıllarında İstanbul ve çevresinden Anadolu'ya taşınan silah atölyelerine dayanmaktadır. Cumhuriyet'in ilk yıllarında bunlara ilaveten savunma sanayii ile ilgili bazı fabrikalar kurulmuştur. Türkiye'nin NATO'ya katılımıyla durgunluk dönemi yaşayan Türk Savunma Sanayii'nde Kıbrıs Barış Harekâtı sonrası Türkiye'ye uygulanan ambargolar yeniden millileşmenin öneminin anlaşılmasına neden olmuştur. 2000'li yıllarda büyük gelişmeler yaşayan Türk Savunma Sanayii'nde millilik oranı sürekli artmakta, Türkiye bu alanda kendine yetebilen ülke olmaya çabalamaktadır. Bu çalışmada, Türk Savunma Sanayiinin gelişimi ve 12. Kalkınma Planındaki hedefleri ele alınmaktadır. Çalışmanın amacı, Türk Savunma Sanayiindeki gelişmeleri araştırarak 12. Kalkınma Planı hedefleri çerçevesinde gelişimini incelemektir. Araştırmada, SaSaD ve SSB verilerinden yola çıkılarak oluşturulan tablo ve grafikler çerçevesinde betimleyici nicel yöntem kullanılmıştır. Araştırmada, Türk savunma sanayisinin 2000'li yılların ilk yarısından itibaren hızlı gelişmelerin olduğu, bu süreçte araiştırma ve geliştirme (Ar-Ge) harcamalarına ayrılan kaynağın savunma sanayiinin gelişimine olumlu katkı sağladığı görülmüştür. Türkiye'nin savunma sanayiinde yerlilik oranının artış eğiliminde olduğu, Türk İnsansız hava araçları (İHA) ve silahlı insansız hava araçlarının (SİHA) dünyada büyük beğeni gördüğü, savunma sanayiinin cirosu ve ihracatının artmakta olduğu ve istihdama katkısını artış eğiliminde olduğu görülmüştür. Veriler Türk Savunma Sanayiinin 12. Kalkınma planı hedeflerine ulaşılabileceğini göstermektedir.

Anahtar Kelimeler: *Ulusal güvenlik, askeri fabrikalar, Türk Savunma Sanayii'nin Gelişimi, Türk Savunma Sanayii'nin hedefleri.*

INTRODUCTION

Security is one of the most important tasks of countries. Countries maintain military forces to ensure their security and meet the needs of these forces through their own capabilities or through imports. Countries that wish to procure military equipment and ammunition through domestic capabilities must develop their defense industry. Defense industry products are high-tech products; countries that manufacture in this sector must have advanced technology and place a high importance on R&D. Furthermore, countries must have sufficient economic resources and knowledge to produce these products.

The foundations of the Turkish Defense Industry date back to the Ottoman Empire. In the years following the First World War, when Türkiye's territory was occupied and the country was fighting to regain its independence from enemy occupation, the foundations of the Turkish Defence Industry were established with the relocation of certain arms workshops from Istanbul and the surrounding area to Anatolia. These factories were brought under the General Directorate of Military Factories in 1921. In 1923, following the declaration of the Republic, Vecihi Hürkuş and Nuri Demirağ established airplane factories in Türkiye, while Şakir Zümre and Nuri Killigil founded arms and ammunition factories. However, these factories closed down over time or were used for purposes other than their designated ones.

Türkiye's accession to NATO and the asistance received under the Marshall Plan negatively affected the Turkish Defense Industry. The embargoes applied to Türkiye following the Cyprus Peace Operation, which was carried out in 1974 to prevent the pressure on Turks living in Cyprus, led to an understanding of the importance of nationalisation in the defense industry. After this date, developments began in the defense industry in Türkiye. The significant growth in the Turkish Defense Industry started in the 2000s. During this process, the Turkish Defense Industry made significant progress, particularly in the field of uncrewed aerial vehicles. The Turkish Armed Forces' requirements have been met mostly with domestic resources, and the level of domestic production in the defense industry has reached 80 per cent. Furthermore, exports have been achieved to certain friendly countries, particularly in the areas of UAVs and armed UAVs. This situation is an indication of the rapidly developing defense industry in Turkey.

The purpose of this study is to examine developments in the Turkish defence industry and investigate its development within the framework of the 12th Development Plan's objectives. In the study, data obtained from SaSad reports covering the period 2007–2024 were presented in the form of tables and graphs and interpreted. In this study, following a literature review, we examine the development of the Turkish defense industry across two distinct periods: pre-2000 and post-2000. The pre-2000 era focuses on the industry's evolution from the Ottoman Empire to 2000, while the post-2000 period analyzes annual turnover, exports, employment contribution, and R&D expenditures using data from SSB annual reports. The 12th Development Plan touched upon the objectives of the Turkish Defense Industry and, by interpreting developments in the sector, attempted to reach a conclusion as to whether the plan's objectives could be achieved. The study was completed with a conclusion and evaluation section. It is thought that this study, which examines the development of the Turkish defense industry and evaluations of the targets of the 12th Development Plan, will contribute to the literature in this field by examining data on the sector's development.

Literature Review

Gül (2025) has examined the development of the Turkish Defense Industry by period. In his research, he states that embargoes contributed to the development of the defense industry, that developments in the defense industry began in the 1980s, and that the products manufactured started to be exported in the period after 2000.

Öztürk (2022) emphasizes the importance of R&D activities in the development of the defense industry in his research, noting that developed countries have high levels of R&D activity and that Türkiye also has high levels of R&D activity.

Sezgin and Sezgin (2018), in their studies on the development of the defense industry world-wide and Türkiye, state that the origins of the Turkish Defense Industry date back to the Ottoman Empire, that a number of military factories were established from the early years of the Republic onwards, and that the defense industry experienced a period of stagnation following Türkiye's accession to NATO. It emphasises that after the Cyprus Peace Operation in 1974, the embargoes imposed on Türkiye led to a prevailing idea of increasing the domestic content in the Turkish Defense Industry, and that the sector experienced a significant increase in the mid-2000s.

Özgen (2016) states in his research that starting in the second half of the 2000s, resources have been

allocated to R&D activities, and the rate of meeting the Turkish Armed Forces' needs domestically increased.

Pınar (2018), in her study, states that developments in the Turkish Defense Industry affect the prestige of countries, that Türkiye's use of domestically produced ammunition in the fight against terrorism is significant, and that advancements in the defense industry have made a positive contribution to Türkiye's foreign policy.

In his study, Ziylan (2001) examines the defense industry in Türkiye during periods starting from the proclamation of the Republic.

Gül and Bayraktar (2025) emphasize the role of embargoes and subsequent policy changes in the later development of the sector.

Eroğluer (2023) and Kurt and Yiğit (2024) provide historical accounts of military factories, institutions and industrial capabilities.

The Development of the Turkish Defense Industry

The Turkish Defense Industry has developed in line with the conditions of the day and carried out its activities. Although it has experienced stagnation at times for various reasons, certain embargoes and difficulties encountered in the procurement of military equipment have enabled Türkiye to recognize the disadvantages of dependence on foreign countries in the field of defense industry. In this context, the Turkish Defense Industry has made rapid strides to meet the needs of the Turkish Armed Forces with domestic capabilities as much as possible, particularly in recent years**.** The development of the Turkish Defense Industry can be divided into two periods: pre-2000 and the post-2000 era

The Turkish Defense Industry in the Period Before 2000

Throughout history, the Turks have shaped their military units according to the conditions of the day and the characteristics of the region they lived in, developing the weapons their armies needed. During the Seljuk period, catapults that launched stones are developed, and Çaka Bey established the first shipyard in Izmir, laying the foundations for the Turkish Navy (T.C. Cumhurbaşkanlığı İletişim Başkanlığı, 2025). The foundations of today's Turkish Defense Industry date back to the Ottoman Empire. During the founding phase of the state, Orhan Gazi purchased the shipyard in Gemlik, followed by the construction of a shipyard in Gelibolu during the reign of Yıldırım Bayezid, the laying of the foundations of the Haliç Shipyard during the reign of Fatih Sultan Mehmet, the establishment of military ammunition facilities consisting of the Imperial Shipyard, Imperial Arsenal, and Gunpowder Factories and the development of the most effective cannons of the era, the Şahi cannons and mortars, prior to the conquest of Istanbul. Cannons and mortars of the era, known as the Şahi cannons, provide insight into the military advancements of the Turks according to the conditions of the time. From the 18th century onwards, the Ottoman Empire, which lagged behind European countries in industry and technology, failed to adapt to the industrial revolution taking place in Europe and fell behind European states in the defense industry (Eroğluer, 2023).

During the War of Independence, some small-scale businesses and machinery located in Istanbul and its surroundings were transferred to Anatolia. These small-scale facilities produced the weapons and ammunition needed by the army. In 1921, the General Directorate of Military Factories was established, and workshops producing in the defense industry in the Republic of Türkiye were brought under one roof. In 1924, an artillery repair workshop, a light weapons and ammunition factory in Ankara, and the Gölcük Shipyard were established (Kurt and Yiğit, 2024). In the early years of the Republic, Vecihi Hürkuş made his first flight in 1925 with the aircraft he built, and in 1926, the Turkish Aircraft and Motor Company (TaMTAS) was established and began production in Kayseri in 1928. Production at this factory ceased in 1939, having produced 112 aircraft: 15 US Hawk fighter planes, 15 Gotha liaison aircraft, and 15 German Junkers A-20 aircraft. In 1936, Nuri Demirağ established an aircraft factory in Istanbul, which was closed in 1943. This factory produced 24 aircraft and numerous gliders (Eroğluer, 2023).

In 1925, Şakir Zümre established an ammunition factory in Istanbul. The factory, which produced war products such as bombs, mines, artillery shells, etc., required by the Turkish Armed Forces, was also forced to close. Towards the end of the 1930s, Nuri Killigil's factory in Sütlüce, Istanbul, which produced mortars, ammunition, and aircraft bombs, was set on fire in 1949, and he himself lost his life in the resulting fire (Kurt and Yiğit, 2024).

In the period following World War II, the Soviet Union did not wish to renew the treaty of friendship and non-aggression signed with Türkiye on December 17, 1925, as its term expired on November 7, 1945. Due to the Soviet Union's demands for bases in the straits and changes to Türkiye's eastern border by ceding Kars and Ardahan to the Soviet Union (Umar, 2004; Uzman, 2018), Türkiye moved closer to the Western Bloc. Türkiye's joining the Western alliance and becoming a member of NATO against the Soviet Union threat, along with the military aid and grants provided by the United States (US) under the Truman Doctrine, had a negative impact on the development of the Turkish Defense Industry (Eroğluer, 2023). Türkiye's membership in NATO created a shield for Türkiye against the Soviet Union threat, but it also led to an increase in dependence on the United States (İstikbal,

2022).

Military aid and grants provided to Türkiye by NATO between 1950 and 1974 had a negative impact on the development of the Turkish Defense Industry, and Marshall Aids dealt a major blow to the development of the defense industry. Many factories began producing outside their original purpose. The aircraft factory was converted into a textile factory, and the artillery factory into a gear factory (Pınar, 2018; Saygılı, 2024). In this period, Türkiye followed a policy of relying on foreign aid or purchasing defence systems from abroad, instead of strengthening its national defense industry (Ziylan, 2001).

In 1963, following attacks by Greeks on the Turkish population in Cyprus, Türkiye brought the issue of intervention on the island to the agenda. The United States opposed Türkiye's intervention. In a letter sent to Turkish Prime Minister İsmet İnönü on behalf of then-US President Lyndon Johnson, it was stated that military equipment sent by the US to Türkiye could not be used without US permission and that in the event of Türkiye's intervention on the island, NATO member states would not assist Türkiye, a NATO member, in the event of a possible Soviet Union attack against Türkiye. Upon this statement, Türkiye abandoned its intervention (2020; U.S. Department of State, 1964, Alptekin and Özer). Johnson's letter stated that weapons obtained by Türkiye from NATO member countries, of which it was an ally, could not be used without the permission of those countries, prompting Türkiye to understand the importance of nationalization in the defense industry (Gül and Bayraktar, 2025). Following this development, the opinion that certain developments are required in the defense industry has become increasingly prevalent.

Following a letter from US President Lyndon Johnson, Türkiye established the Turkish Air Force Strengthening Foundation in 1970, the Turkish Naval Forces Strengthening Foundation in 1972, and the Land Forces Strengthening Foundation in 1974. In 1987, these foundations were merged under the umbrella of the Turkish Armed Forces Strengthening Foundation (Sezgin and Sezgin, 2018).

The embargo imposed on Türkiye following the 1974 Cyprus Peace Operation highlighted the necessity of a domestic and national defense industry in Türkiye. In 1975, Phantom aircraft were not delivered to the Turkish Armed Forces despite payment, and Türkiye was also deprived of the necessary spare parts for the maintenance and repair of existing aircraft during this process. After this date, some developments began to take place in the defense industry. In 1973, Turkish Aircraft Industry Inc. (TAI) was established through the efforts of Turkish Air Force Strengthening Foundation. In 1975, ASELSAN was established by the Turkish Armed Forces Foundation to meet the military communication needs of the Turkish Armed Forces (TSK). This was followed by ROKETSAN and MKE Çankırı Weapons Factory (Kurt and Yiğit, 2024). In 1972, the Defense Industry Research and Development Institute was established within TÜBİTAK, laying the foundation for R&D activities in the defense industry. In 1984, TUSAŞ Aviation and Space Industry Inc. (TAI), a Turkish-American joint company, was established. On November 7, 1985, Law No. 3238 was enacted, establishing the Defense Industry Development and Support Administration was established, and in 1989, this institution was transformed into the Undersecretariat for Defense Industries (SSM) by Decree Law No. 390 (SSM, 2015). The Undersecretariat for Defense Industries was tasked with the production of all types of weapons, ammunition, vehicles, and equipment for the country. While the needs of the Turkish Armed Forces were generally met through imports until 1990, there was a shift towards joint production between 1990 and 2000. (SSB, 2025).

Starting in 1983, Türkiye began manufacturing armored combat vehicles (Eroğluer, 2023). Additionally, during this period, the Defense Industry Support Fund was established to provide military expenditures from non - budgetary sources. Between 1985 and 1990, 98% of defense products were imported. In other words, the localization rate in the defense industry was around 2%. In 2003, the sector's localization rate was reported to be around 20%. During the 1980-1990 period, institutions such as ASPİLSAN, HAVELSAN, TUSAŞ, ROKETSAN, etc. were established. In the 1990s, the TR-122 Mızrak Rocket and the T-122 Sakarya Multiple Rocket Launcher System produced by ROKETSAN were added to the inventory in 1996 and constituted important gains for the Turkish Defense Industry (T.C. Cumhurbaşkanlığı İletişim Başkanlığı, 2025).

The Turkish Defense Industry in the 2000's

In the 2000s, events occurring around Türkiye posed a threat to the country's security. As a result, Türkiye's allies responded with an arms embargo when Türkiye conducted cross-border operations to establish its security. In the 2000s, Türkiye sought to purchase Reaper and Cobra unmanned aerial vehicles from the United States, but the US did not approve the sale. This and similar situations contributed to rapid developments in the Turkish Defense Industry from the early 2000s onwards. During this period, the Turkish Defense Industry developed further and gained the ability to compete on a global scale (Seren, 2022).

The 2004 Defense Industry Executive Committee meeting marked a turning point in terms of prioritizing nationalization efforts in the defense industry. At this meeting, it was decided to abandon tenders for tanks, helicopters, and unmanned aerial vehicles needed by the Turkish Armed Forces and to emphasize that these should be produced with domestic capabilities and that the design and projects of the products should be domestic (Seren, 2022). The government allocated $300 million to support research and development (R&D) efforts and has continued to prioritize R&D activities since then. During this period, the goal was not only to produce foreign-owned project products domestically, but also to design and manufacture products based on national projects. Within this framework, the ATAK and GÖKBEY helicopters, the HÜRKUŞ training aircraft, the ALTAY tank, and MİLGEM projects were developed, and the process of incorporating these products into the inventory of the Turkish Armed Forces began (Seren, 2022). In 2005, TÜBİTAK launched the Defense and Space R&D support program (DPT, 2006).

The Ninth Development Plan, published in 2006 and covering the period 2007-2013, aims to meet needs in a stable and secure manner using national resources. To this end, the defense industry is expected to integrate with the country's industry to carry out joint product design and R&D work, maximize the use of existing infrastructure and technology, and develop international competitiveness in the defense industry (DPT, 2006).

Since 2010, emphasis has been placed on developing product design programs in the defense industry and on projects to procure the required products domestically (Saygılı, 2024). In this context, Undersecretariat for Defence Industries Strategic Plan covering the period 2012-2016 aims to meet the needs of the Turkish Armed Forces domestically, encourage the increase in and aviation product exports, and implement projects aimed at developing systems that will provide technological superiority (SSM, 2011). In 2017, with the TTA-2 contract, KIRPI II vehicles and vehicles used for explosive detection were added to the Turkish Armed Forces inventory (SSB, 2025).

The 10th development plan covering the period 2014-2018 emphasizes making the defense industry competitive, developing defense systems, increasing the share allocated to R&D, and supporting clustering in certain defense industry areas (Saygılı, 2024).

In January 2015, the United States Congress blocked the transfer of Oliver Hazard Perry-class (FFG) guided-missile frigates to the Turkish Navy, which had originally been slated for donation or low-cost sale. Instead, the US Congress approved the delivery of surplus warships to non-NATO members, specifically Mexico and Taiwan (Seren, 2022). These discriminatory practices further strengthened the conviction within Türkiye that the requirements of the Turkish Armed Forces must be met through indigenous capabilities.

With the transformation of Defense Industry Directorate, which operates in the defense industry, into the Presidency of Defense Industries (PDI) under the Presidency in 2018, PDI has become the management center for projects in the sector, and activities related to the planning and financing of Türkiye's national defense projects have been included within the authority of this institution.

Due to Türkiye's geographical location, events occurring in neighboring countries, the disintegration of Iraq's territorial integrity, the Syrian civil war, the Russia-Ukraine war, the decades-long struggle against the PKK and YPG terrorist organizations, the issue of sharing natural resources in the Eastern Mediterranean, and continental shelf disputes with Greece necessitate the development and nationalization of Türkiye's Defense Industry. In the past, the Heron aircraft that Turkey purchased from Israel did not contribute to Turkey's fight against terrorism in the same way as our domestically manufactured UAVs and armed UAVs. In this context, Türkiye has aimed to increase the localization rate in the defense industry in order to successfully combat internal and external threats. During this process, companies in the Turkish Defense industry, such as ASELSAN, ROKETSAN, TUSAŞ, and Baykar, have managed to enter the top 100 companies operating in the defense industry worldwide and have increased Türkiye's effectiveness in international markets (T.C. Cumhurbaşkanlığı İletişim Başkanlığı, 2025). Over time, the private sector's interest in this field has also increased, and private sector companies such as Baykar, BMC, and FNSS, alongside public institutions such as ASELSAN, ROKETSAN, HAVELSAN, and TAI, are contributing to this field by producing important projects (T.C. Cumhurbaşkanlığı İletişim Başkanlığı, 2025).

Türkiye is making significant progress in the field of land vehicles within its defense industry. The ALTAY tank project is the first initiative that comes to mind in this field. Launched through an agreement with BMC on March 30, 2007, the ALTAY tank project is ongoing, and the tank was delivered to the Turkish Armed Forces for testing on April 23, 2023. In addition, the Armored Amphibious Assault Vehicle (ZAHA) has taken its place among the Turkish Armed Forces's important combat vehicles, designed to quickly cover the distance between ships and the shore during amphibious landing operations (T.C. Cumhurbaşkanlığı İletişim Başkanlığı, 2025).

The MPT-76 infantry rifle, which can be used in all weather and terrain conditions, has been produced, and work is underway to produce machine guns. Furthermore, work is continuing to increase the striking power of the ammunition used in the T-1555KM Fırtına Howitzers (SSB, 2025).

The Turkish Defense Industry continues to develop in the field of aviation. The most challenging aspect of air defense systems is engine production. Only a limited number of countries in the world are capable of producing engines. Türkiye is also working in this area. The piston engines used in UAVs were developed with the TS 1400 engine and integrated into GÖKBEY helicopters (STM, 2021).

Türkiye, which is developing day by day in the production of Unmanned Aerial Vehicles (UAV) and Armed Unmanned Aerial Vehicle (UCAV), has taken its place among the leading countries in the world. The success of Turkiye's domestically and internationally produced UAVs and UCAV has been featured in the world press. ANKA and Bayraktar TB2 are UAVs and UCAV that make a significant contribution to our security forces in the fight against terrorism and are also among the important export products of our defense industry. ANKA unmanned aerial vehicles have enabled the Turkish Armed Forces' intelligence and reconnaissance needs to be met with domestic capabilities. Work continues in Türkiye on unmanned combat aircraft and UCAV systems capable of taking off and landing from ships. Bayraktar TB3 is one of the important projects developed in this field, equipped with domestic smart ammunition, adding strength to the Turkish Armed Forces's power (SSB, 2025). The Bayraktar TB2s used in the Qarabag War played a significant role in winning the war. The use of UAVs reduces human casualties, considered human capital, while also enabling rapid and precise attacks (Gençoğlu, 2025).

Following the Bayraktar TB2, Baykar company has also developed the Bayraktar AKINCI. Capable of carrying strategic munitions such as the SOM cruise missile, the AKINCI enhances the Turkish Armed Forces' offensive capabilities and can conduct aerial bombardment. Additionally, the Bayraktar KIZILELMA, which made its first flight in 2022, is a fifth-generation unmanned combat aircraft with high maneuverability and the ability to take off and land from short-runway ships and is one of Türkiye's significant projects in this field (T.C. Cumhurbaşkanlığı İletişim Başkanlığı, 2025).

ATAK helicopters, with their high maneuverability and domestic ammunition, make important contributions to Turkish Armed Forces operations and are also exported to countries such as the Philippines and Pakistan (T.C. Cumhurbaşkanlığı İletişim Başkanlığı, 2025). The integration of anti-tank weapon systems into ATAK helicopters has been achieved, yielding successful results. Kits designed to increase the target accuracy of general-purpose bombs used in fighter jets are produced domestically (SSB, 2025).

KAAN, one of TUSAŞ's flagship projects, is a fifth-generation fighter jet characterized by supersonic speed, a low radar cross-section, and AI-powered avionics. It successfully completed its maiden prototype flight in 2024, positioning Türkiye among a select group of nations capable of producing such advanced aviation technology. Globally recognized as one of the top 50 aerospace and defense enterprises, TUSAŞ actively exports its diverse product portfolio to numerous countries. Additionally, HÜRJET, an advanced jet trainer and light attack aircraft developed by TUSAŞ, achieved its milestone first flight on April 25, 2023 (T.C. Cumhurbaşkanlığı İletişim Başkanlığı, 2025). Collectively, these milestones underscore Türkiye's significant advancements in aerospace engineering.

Türkiye manufactures domestically in many areas, such as assault ships, corvettes, frigates, submarines, unmanned naval vehicles, and logistical support ships. The TCG Anadolu, a multi-purpose amphibious assault ship built and equipped by Türkiye, can carry 10 helicopters or 50 UCAVs, can carry landing craft in its well deck, has the capacity to transport an amphibious battalion, and includes a hospital. It is the largest ship in the Turkish navy. Additionally, Türkiye's submarine construction projects are ongoing (T.C. Cumhurbaşkanlığı İletişim Başkanlığı, 2025).

Today, the Gökdeniz close system used in the Turkish Navy, the AKREP-D fire control radar used on our ships, the illumination radar, and the torpedo tube system have been developed by ASELSAN. The combat management systems, which are critical for submarines and warships and are important in determining the nature, origin, and type of threats, as well as contributing to determining the steps to be taken against threats, were developed by HAVELSAN and the Naval Forces Command Research Center Command. Additionally, torpedo countermeasures systems and electronic systems produced by ASELSAN are used on our ships (STM, 2021).

Research and Development (R&D) Spending

The defense industry is a high value-added sector, and the state is its main customer. Therefore, the state supports R&D activities in this field. Technological advancements in this field are not only used in the defense industry but also in other sectors, contributing to the country's development (Baran, 2018). Türkiye has been increasing its R&D expenditures since the first quarter of the 2000s.

R&D work is important for achieving global competitiveness. Ten countries account for 75% of global R&D spending. Türkiye's allocation of resources to R&D is around 1% of its Gross Domestic Product (GDP). In recent years, there has been an increase in the number of R&D studies and projects. Numerous R&D projects have been

started under the leadership of the Presidency of the Defense Industries. ASELSAN states that it allocates approximately 7% of its annual turnover to R&D activities. In addition, the Ministry of Industry and Technology and TÜBİTAK also support R&D projects (Öztürk, 2022). The number of projects carried out in the defense sector in Türkiye has increased 17-fold from 62 in 2002 to over 1380 in 2024 (T.C. Cumhurbaşkanlığı İletişim Başkanlığı, 2025).

In Türkiye, R&D Executive Board meetings are held, consisting of senior executives from the Ministry of National Defense, the Ministry of Industry and Technology, and the Defense Industry Presidency, with the aim of ensuring cooperation among public institutions conducting R&D activities. Work is being done on the use of artificial intelligence in the defense industry and military field. Additionally, work is planned on joint communication technologies that coordinate naval, air, and land forces vehicles. Additionally, studies are being conducted on joint swarm communication technologies to coordinate sea, air, and land forces (SSB, 2025).

Development of Quantum Technologies Program Within the framework of the Quantum Technologies Development Program, radar studies are continuing, including quantum navigation and electronic warfare techniques with invisibility technology that can detect targets without their own signals being detected (SSB, 2025).

Table 1: Financial and Operational Indicators of the Turkish Defense Industry by Years

Years	Total Turnover (Million USD)	Domestic Consumption (Million USD)	Exports (Million USD)	Imports (Million USD)	Orders Received (Million USD)	Employment (Persons)
2007	3,022	2,407	615	-	-	-
2008	3,112	2,328	784	-	-	-
2009	3,067	2,235	832	-	-	-
2010	4,174	3,321	853	-	-	-
2011	4,400	3,300	1,100	-	-	-
2012	4,800	3,538	1,262	1,409	-	33,491
2013	5,076	3,506	1,570	1,327	8,000	32,368
2014	5,101	3,246	1,855	1,351	11,000	31,242
2015	4,908	2,979	1,929	1,067	7,687	31,375
2016	5,968	4,015	1,953	1,289	11,913	35,502
2017	6,693	4,869	1,824	1,544	8,055	44,740
2018	8,761	6,573	2,188	2,449	12,204	67,239
2019	10,884	7,816	3,068	3,088	10,671	73,771
2020	8,855	6,590	2,265	2,161	6,174	77,566
2021	10,159	6,934	3,225	2,062	8,576	75,660
2022	12,196	7,800	4,396	2,700	8,797	81,132
2023	15,710	10,165	5,545	3,304	20,112	90,969
2024	20,000	12,846	7,154	-		-

Source: SaSaD Yıllık Raporlar; 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023; Savunma SanayiST, 2024; SSB, 2026

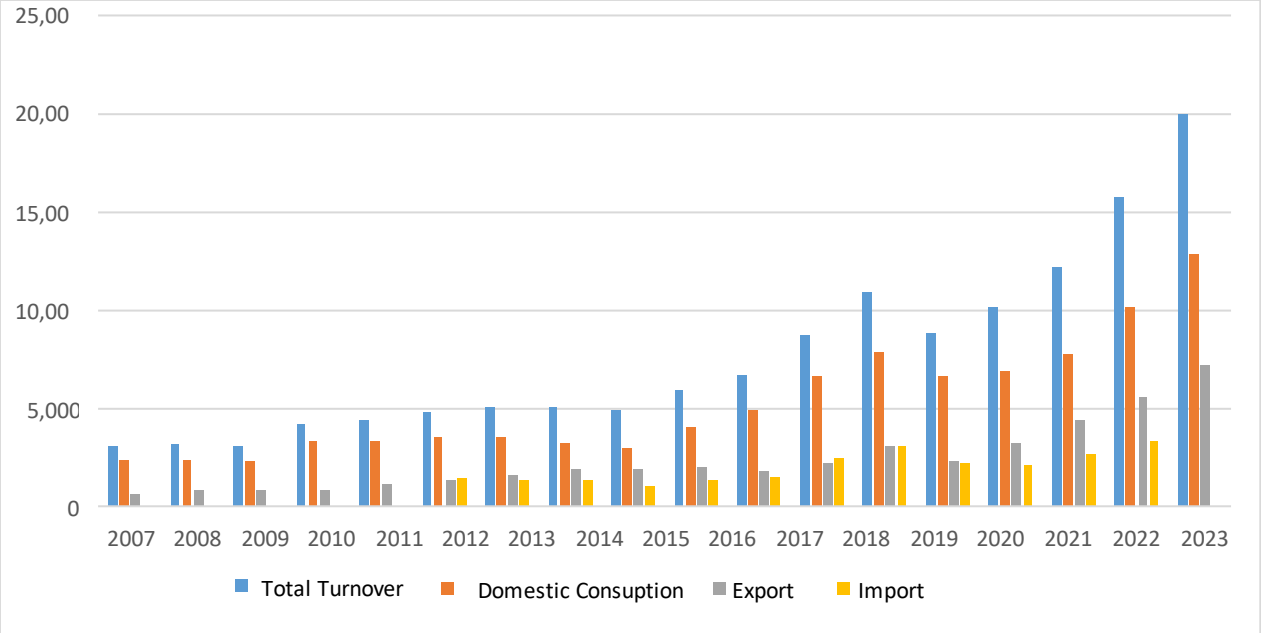

Figure 1: Turkish Industry Indicators (Million USD).

Source: SaSaD Yıllık Raporlar; 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023; Savunma SanayiST, 2024.

Table 1 and Figure 1 contain data on companies operating in the Turkish Defense Industry between 2007 and 2024. During this period, the turnover of companies operating in the defense industry increased from $3,022 million in 2007 to $15,710 million in 2023 and reached $20,000 million in 2024. Over the 17-year period, the turnover of companies within the Defense and Aerospace Industry Manufacturers Association (SASAD) increased more than sixfold (561.81%), rising by approximately $17 billion. Developments in the Turkish Defense Industry indicate that the defense industry is progressing towards becoming one of the driving sectors of the country's economy. When examining the sub-sectors of the defense industry, the aerospace sub-sector is clearly in the lead, followed by the weapons, ammunition, and missile sub-sector and the land platform sub-sector (SASAD, 2023).

The vast majority of products manufactured are used to meet the needs of the Turkish Armed Forces. Although exports declined during the Covid-19 pandemic period following the post-2018 period when exports increased, this was temporary, and exports continued to increase in the subsequent period. Calculated using the one-decimal rounding method, our exports, which were $2,265 million in 2020, increased by 215.9% to $7,154 million in 2024. The ratio of our defense industry product exports to product imports increased after 2020, and the industry began to generate a current account surplus.

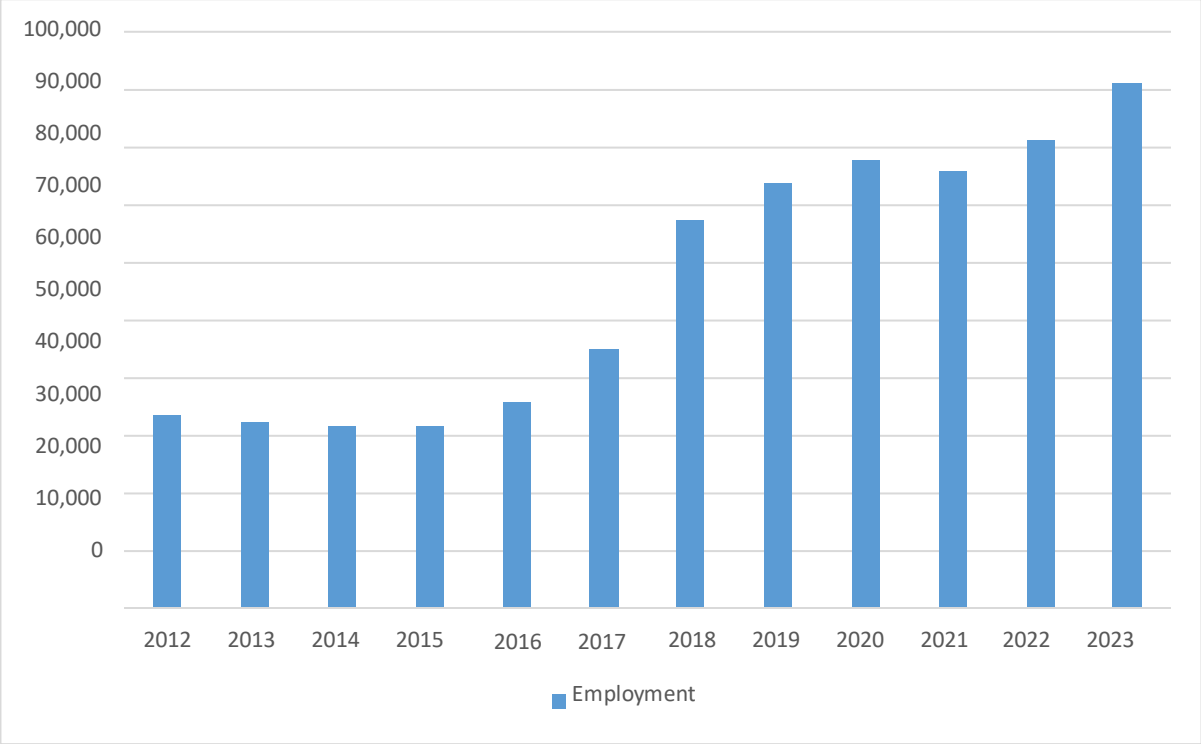

Figure 2: Employment in The Turkish Industry Sector.

Source: SaSaD Yıllık Raporlar; 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023; Savunma SanayiST, 2024.

Table 1 and Figure 2 show the number of people employed in the Turkish Defense Industry. When we examine the graph, we see that the number of people employed in the sector is on an upward trend and that the defense industry is making a positive contribution to employment. While 33491 employees were employed in the sector in 2012, this figure rose to 90969 in 2023. Over the 12-year period, 57478 additional jobs were created. Therefore, the sector also makes a positive contribution to reducing unemployment.

Table 2: Industry R&D Expenditure and Orders Received (Millions USD).

Years	R&D Spending	Orders Received		
		Domestic Orders	International Orders	Total
2007	367	-	-	-
2008	509	-	-	-
2009	505	-	-	-
2010	666	-	-	-
2011	672	-	-	-
2012	772	-	-	-
2013	926	-	-	8,000
2014	887	-	-	11,000
2015	904	-	-	7,687
2016	1,254	10,611	1,302	11,913
2017	1,234	4,343	3,712	8,055
2018	1,448	10,580	1,624	12,204
2019	1,672	6,454	4,217	10,671
2020	1,240	3,350	2,825	6,174

Years	R&D Spending	Orders Received		
		Domestic Orders	International Orders	Total
2021	1,639	4,172	4,404	8,576
2022	2,061	4,023	4,774	8,797
2023	2,622	14,618	5,494	20,112

Source: SaSaD Yıllık Raporlar; 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023.

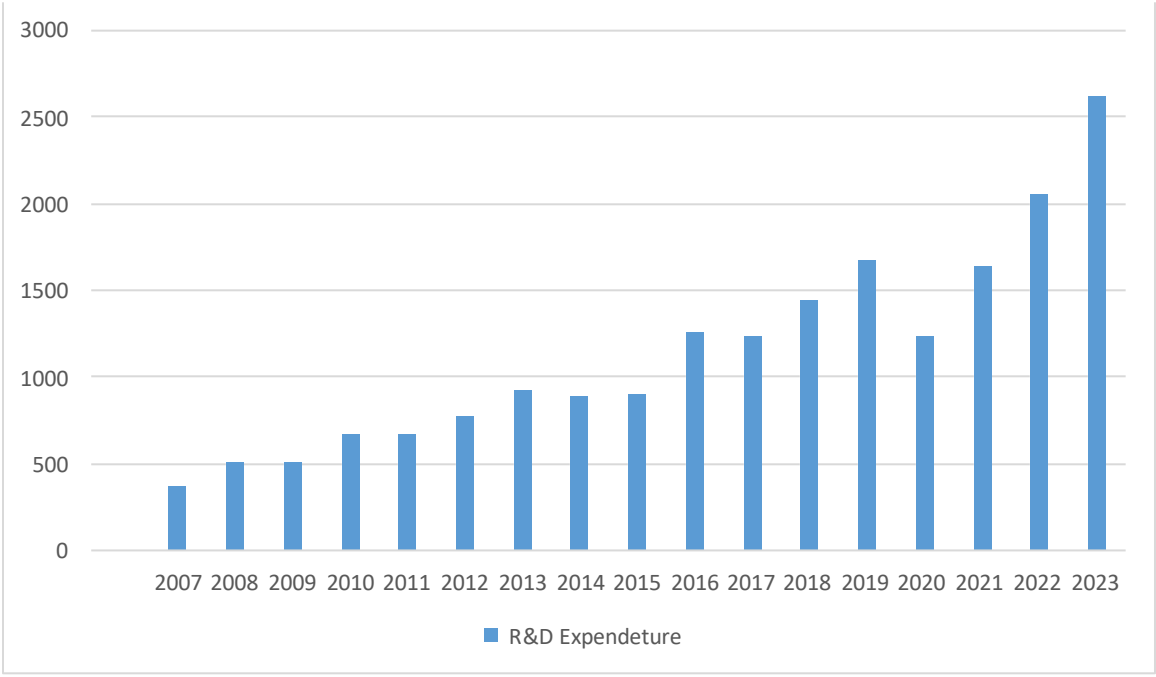

Figure 3: Turkish Industry R&D Expenditure (Millions USD).

Source: SaSaD Yıllık Raporlar; 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023.

Table 2 and Figure 3 show Türkiye's R&D expenditures in the field of defence industry and orders in the sector. R&D expenditures, which were $367 million in 2007, increased steadily each year to $904 million in 2015, $1240 million in 2020, and in 2023, it increased to $2622 million. Although these developments reflect a positive trend, recent geopolitical shifts and the lukewarm support from certain NATO allies in Türkiye's counter-terrorism efforts emphasize the critical need for strategic autonomy. In this context, considering the possibility that NATO may not stand by Türkiye in potential crises, it should be considered appropriate for Türkiye to allocate more resources to its defense industry and further increase R&D efforts in this area.

Table 2 and Figure 4 show the orders received by the Turkish Defense Industry. There has been a noticeable increase in orders received by the sector, particularly after 2022. Looking at the orders received by the sector, it is seen that they were around 6-11 billion dollars in the 2013-2022 period, and that the orders, which were 8797 million dollars in 2022, rose to 20112 million dollars in 2023. A 128% increase has been recorded in the orders received by the sector in the last year. While there is a periodic increase in orders received by the sector from abroad, orders received from within the country have fluctuated, with a jump in 2023. The share of foreign orders in total orders is increasing.

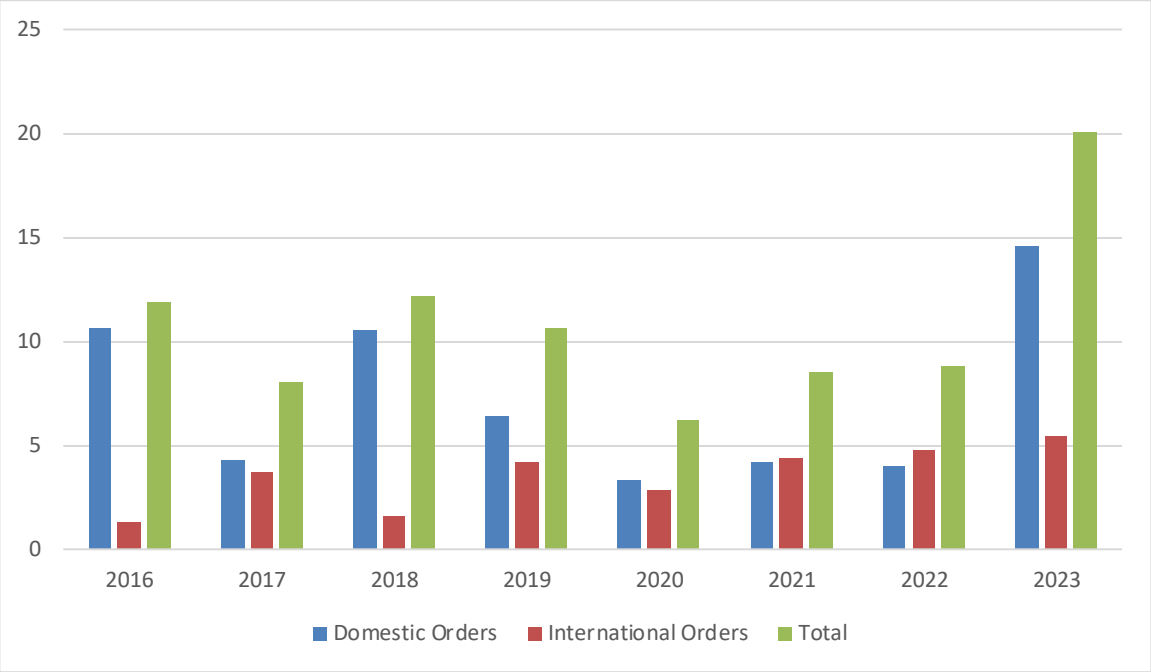

Figure 4: Orders Received by the Turkish Defense Industry (Millions Dollars)

Source: SaSaD Yıllık Raporlar; 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023.

Goals of the Turkish Defense Industry

The 11th and 12th Development Plans include goals for the defense industry. The 11th Development Plan, covering the years 2019-2023, aims to meet the needs of the Turkish Armed Forces to the maximum extent possible with national resources, develop projects that will minimize dependence on foreign countries in the defense industry, increase the localization rate in the defense industry, and increase the number of Altay tanks and UAVs. Furthermore, to ensure the sustainability of the defense industry, it is envisaged to strengthen the education infrastructure to provide qualified labor and to provide training through the Defense Industry Academy, as well as to support companies operating in this field (T. C. Cumhurbaşkanlığı, Strateji ve Bütçe Başkanlığı, 2019). Research shows that the localization rate in the defense industry is increasing and that Türkiye is progressing towards its planned targets.

The 12th Development Plan aims to meet our country's defense and security needs to the maximum extent possible with domestic and national resources, increase global competition in the defense and aviation sectors, and increase economic productivity by transferring the skills acquired in the defense industry to the civilian sector. To this end, the goal is to achieve the capability to meet the demands of Türkiye and its allies friendly and allied countries. It is emphasized that R&D and product development activities in the fields of artificial intelligence, quantum technologies, hypersonic technologies, and autonomous systems should be supported, and that the educational infrastructure should be strengthened to meet the sector's increasing need for qualified personnel. Furthermore, emphasis is placed on supporting large companies operating in the defense industry, enhancing competitiveness, increasing the sector's export potential, strengthening international cooperation, and ensuring the effective use of military expertise in the civilian sector. The goal is to increase the Defense and Aerospace Industry's turnover from $15 billion in 2023 to $26 billion in 2028, and to increase exports from $5.5 billion in 2023 to $11 billion. The employment rate in the defense industry, which was 90000 in 2023, is targeted to increase to 158000 in 2028, and the localization rate, which was 80% in 2023, is targeted to increase to 85% in 2028 (T. C. Cumhurbaşkanlığı, Strateji ve Bütçe Başkanlığı, 2023).

The National Combat Aircraft (KAAN) project, launched to meet the aircraft needs of the Air Force Command, achieved a significant milestone with its first test flight on February 21, 2024. Following the prototype phase, development activities are ongoing, and the aircraft is planned to be added to the inventory of the Turkish Armed Forces in 2028. Additionally, T-129 ATAK helicopters are being produced, and there is demand for these helicopters from some countries (SSB, 2025).

One of Türkiye's goals is the steel dome project. This artificial intelligence-supported project is one of the important projects of the Turkish Defense Industry. This project involves a multi-layered system against air and missile threats (T. C. Cumhurbaşkanlığı, Strateji ve Bütçe Başkanlığı, 2019).

Table 3. Developments in the Turkish Defense Industry (%)

Years	Change in Total Turnover	Change in Domestic Consumption	Export Increase Rate	The Rate of Increase in Orders Received	Employment Increase Rate
2020	-18.5	-15.7	-26	-42	5
2021	14.5	5	42.4	39	-2.5
2022	20	12.5	36	2.5	7.2
2023	28.8	30.3	26	128.5	12
2024	27.3	26.3	29	-	-

Source: SaSaD Yıllık Raporlar; 2019, 2020, 2021, 2022, 2023; Savunma SanayiST, 2024. The rates have been calculated by us

Although the Turkish Defense Industry experienced a decline during the COVID-19 pandemic due to the downturn in global trade and restrictions on movement, the fact that increases in total turnover have reached 20% or more over the last three years, and that the sector is projected to reach $20 billion by 2024. The findings show that Turkey is progressing towards the 2028 target.

Exports of defense industry products, which declined during the pandemic, have shown a continuous upward trend in the post-pandemic period. Annual export growth rates were recorded as 42% in 2021, 36% in 2022, 26% in 2023, and 29% in 2024, representing a significant cumulative increase over the 2020–2024 period. In terms of value, defense exports reached $7,154 million in 2024. This sustained growth in actual data and the ongoing increase in recent orders strongly indicate that the target of $11 billion originally set for 2028 is well on track to be possible.

It is anticipated that the 128.5% increase in orders received by the Turkish Defense Industry in the year 2023—rising from $8797 million to $20112 million compared to the previous year—will contribute significantly to an increase in employment. The sector will have to increase its capacity in order to meet the production demands of the orders received. Capacity increase also leads to an increase in employment.

The fact that Türkiye's Defense Industry exports are projected to reach $7154 million by 2024 suggests that achieving the set targets will not be particularly difficult. Military equipment and air defense systems exported to various countries, along with orders received from abroad, may position the Turkish Defense Industry to potentially exceed its set targets. The increasing demand for Turkish UAVs and UCAVs can be seen as an indicator that we can achieve our goals. Furthermore, the increasing rate at which the Turkish Armed Forces' needs are met with domestic capabilities shows that reaching the 85% domestic content target by 2028 is within reach. The sector's sub-sectors, including Small and Medium-Sized Enterprises are developing. Consequently, the number of people employed is also increasing every day. Ultimately, Türkiye's 12th Development Plan targets does not seem too far off.

CONCLUSION AND EVALUATION

The Turkish Defense Industry, founded on the relocation of arms workshops from the Istanbul area to Anatolia during the years of the War of Independence, continued its development until the years of World War II. In the post-war period, Türkiye's membership in NATO and the military aid provided by the US led to the decline of the Turkish Defense Industry. Following the 1974 Cyprus Peace Operation, the embargo imposed on Türkiye by the US highlighted the disadvantages of dependence on foreign countries in the industry. After this date, some steps were taken in the Turkish Defense Industry, and ASELSAN was established in 1975. Later, some developments in the defense industry took place with the establishment of organizations such as the Turkish Armed Forces Foundation.

The major leap in the Turkish Defense Industry occurred in the2000s. The 2004 meeting of the Defense Industry Executive Committee marked a turning point in terms of the importance given to nationalization efforts in the defense industry. Following this meeting, the Turkish Armed Forces abandoned tenders for tanks, helicopters, and unmanned aerial vehicles and adopted the production of these with domestic capabilities. It was decided to switch to domestic production in areas such as helicopters, armored vehicles, and UAVs. In subsequent

years, the Turkish Defense Industry has produced armored ground vehicles, rocket launchers, missile systems, various electronic communication devices, GÖKBEY and ATAK helicopters. It has taken its place among the world's leading countries in UAV and UCAV production. Alongside public institutions such as ASELSAN, ROKETSAN, HAVELSAN, and TAI, private sector companies such as Baykar, BMC, and FNSS have also contributed to this field by producing important projects. The Turkish Defense Industry has become a key player in the global market.

The rapidly developing Turkish Defense Industry meets the needs of our country and also exports a portion of the products it manufactures. Companies operating in this field had a turnover of $20 billion in 2024, exported over $7 billion, and created employment for more than 90000 people.

The 12th Development Plan also includes targets for the Turkish Defense Industry. According to the plan's targets, the localization rate, which is 80% in 2024, is expected to reach 85% in 2028, the turnover, which is $20 billion in 2024, is expected to reach $26 billion by 2028, and exports, which are $7 billion, to reach $11 billion, and the number of employees, which is 90000, to reach 158000. The observed trends suggest that Türkiye's defense industry has made substantial progress toward the objectives of the 12th Development Plan; however, the achievement of the 2028 targets will depend on future investment, export performance, R&D capacity, macroeconomic conditions, and technological developments.

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Etik Kurul Onayı / Ethics Committee Approval: Bu araştırma, kamuya açık arşiv belgeleri, resmi raporlar ve ikincil veriler (secondary data) kullanılarak yürütüldüğünden etik kurul izni gerektirmemektedir. / Since this study was conducted using publicly available archival documents, official reports, and secondary data, it does not require ethics committee approval.

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