
**Turkish Defense Industry’s Scramble Against Arms Embargoes and Engine Production**

İbrahim Karataş  
Orcid: 0000-0002-2125-1840

**Abstract**

Turkey is scrambling for manufacturing its indigenous weapons to gain self-sufficiency for military equipment. Yet, sanctions imposed by the US and NATO members make the venture more arduous. On the other hand, arms embargoes have also provoked and motivated Turkish authorities to switch to domestic production. Thanks to embargoes, Turkey has achieved to provide 75% of its army’s needs indigenously. Nevertheless, it is in a desperate position for producing engines for larger and more advanced weapons such as aircraft and tanks, which require technology transfer. On the other hand, it could produce engines for low and medium-range missiles and armored vehicles. Western powers’ attempts to halt Turkey's ambitions will probably be inefficient since the country has already reached a conspicuous level. Easy acquisition of advanced technology for arms production, distrust to other NATO allies and the independent foreign policy are other reasons that push Turkey for indigenization.

Keywords; Turkey, Embargo, Security, Defense Industry, Arms

**Türk Savunma Sanayisinin Silah Ambargolarına ve Motor Üretimine Karşı Mücadelesi**

**Öz**


Anahtar Kelimeler; Türkiye, Ambargo, Güvenlik, Savunma Sanayi, Silahlar

**Introduction**

Turkey has been on a course of reducing its arms dependence from its Western allies, particularly the United States, since its intervention in Cyprus in 1974. Realizing that the West was not the absolute protector of its security, the Turkish state and army began to diversify its suppliers and to support indigenous weapons production. Beginning with the co-production of certain weapons under the license of foreign producers, it later launched a Turkification program in order to be self-sufficient in terms of military equipment. However, this new venture was more painful than expected. There were times when Western powers did not even sell ordinary weapons, an attitude causing disappointment among Turkish leadership. Yet, it also motivated and provoked them to realize their defense-related goals. As it will become apparent in this discussion, all punitive behaviors of the USA and European countries resulted in more investment in the Turkish defense industry not less. In other words, the alienation of Turkey hurt its military power in the short-term but led to more made-in-Turkey weapons.
Specifically, when AK Party (Justice and Development Party) headed by Recep Tayyip Erdogan came to power, indigenization became one of the main goals of the government that provided abundant subsidies to defense companies and encouraged them to lessen the dependence on foreign companies. The result of the campaign is promising and impressive, as the Turkish military attained advanced Turkish weapons such as Unmanned Aerial Vehicles (UAVs), helicopters, missiles, guided munitions, surface-to-air missiles, and so on. In addition, Turkish companies are now striving to produce a fighter jet and a tank, which are relatively more difficult to produce.

This study aims to analyze how sanctions affected the Turkish army’s capabilities and forced Turkey to produce its indigenous weapons. Besides, it focuses on the difficulties it encountered during the process. The study argues that Turkey pursued its own interests in the defense industry because; (1) its allies were reluctant to accept an autonomous Turkey not only in military terms but also in foreign policy, (2) Turkey has feared that dependency on Western countries will not allow it to pursue its interests, (3) Turkey’s trust of its allies have lessened in recent years, and (4) indigenous products are cheaper and exportable to foreign markets. To fulfill the above goals, Turkish policymakers follow paths of France, which aimed to free itself from American domination in the 1960s (Real-Pinto, 2017: 307). When analyzed, it can be seen that the most difficult obstacle Turkey faces is engine production. Turkish companies are confident in producing components a variety of weapons but when it comes to engines, they are in a desperate position. Since engine technology is far ahead of any other arms technologies, only a few countries can produce them. Therefore, without the share of technology, no country including Turkey can gain full independence in terms of weapons. The Turkish state and private defense companies are now struggling to produce engines for their land, sea and air weapons. If they can produce engines, particularly for those weapons like tanks and aircraft, they will indeed create a success story. However, its partners seem reluctant to help Turkey jump over this trench. Overall, this study will examine arms embargoes (hereafter the word ‘sanction’ will be used interchangeably) on Turkey, their impacts, Turkey’s response with indigenous weapons production and its struggle with engines. Methodologically, literature review was wielded in order to write this article. The study is expected to shed light on the consequences of arms embargoes and its repercussions. Besides, it aims to contribute literature by analyzing dependence on other countries in terms of military equipment and struggle for producing indigenous weapons.

Our study will continue with the development of the Turkish defense industry from the 1930s onwards. It will then focus on declared and undeclared arms embargoes. Finally, it will analyze the engine problem of various weapons.

A Historical Overview of Turkey’s Defense Industry

‘Born as soldiers’ is a widely used motto by Turks to glorify themselves and their past. Indeed, Turks founded a few empires and tens of states throughout history thanks to the militarist nature of their life and ruling. The most conspicuous state they founded was the Ottoman Empire, which spread over three continents including Eastern Europe. While the success came from military strength, it was the military weakness that led to its collapse. The Ottomans actually tried to modernize their armies in the 19th century but failed (Erdincler, 2019: 4). During the war of independence that brought about the foundation of modern Turkey, the Turkish army defended itself with granted weapons, as it had no defense industry. Turkey still did not produce weapons in the early decades of the republic and imported them from abroad with some exceptions. For example, Tayyare ve Motor Türk AŞ (TamTAŞ) was established in 1926 and produced 112 aircraft under German and US licenses (Mevlutoglu, 2017: 283). There were also private enterprises that established aircraft factories in the 1930s and 1940s. Nevertheless, Marshall Aid and Turkey’s NATO membership led to the closure of public and private factories as a direct result of military aid supplied by the USA. The Turkish government preferred the free and a bit more advanced aircraft to locally produced ones, thereby undermining the indigenous defense industry in its beginning phase.

NATO membership meant collective defense and protection of allies by relatively more powerful members, particularly by the USA. Assuming that Americans would protect Turkey from any threats and supply weapons, the Turkish government did not invest in its armament. The Johnson letter that warned Turkey not to use American-made weapons in a likely intervention in Cyprus made the government think that the USA might not defend Turkey in all circumstances. Unfortunately, it was not enough to get politicians and the military take notice. It was the eventual intervention of Turkey in Cyprus that awakened the Turkish government as to how defenseless and alone the country was. Until the Cyprus dispute, the USA was supplying more than 90% of Turkey's military equipment (Balci and Celik, 2019: 103). When the US Congress imposed embargoes on Turkey due to Cyprus intervention, half of the military aircraft was rendered out of use because of the lack of spare parts (Durmaz, 2014: 1). Besides depriving Turkey of equipment and spare parts, American embargoes caused disappointment and injury to national pride. However, the new situation was also in Turkey's favor as it decided to produce its weapons indigenously. The Turkish army began to establish defense companies through its foundations, which later merged under the
name of the Turkish Armed Forces Foundation (Türk Silahlı Kuvvetlerini Güçlendirme Vakfı) in 1987. This foundation established companies such as Aselsan (army electronics), Havelsan (army electronics) Aspslsan (army batteries) and Tusas (aircraft industry) in the 1970s and 1980s (SSB, 2019). Besides, the government opened the Directorate of Defense Industries in 1985.

While institutionalization was ongoing, the Turkish army bought weapons from other countries like Italy and Germany. However, the military was still dependent on US products. Fortunately, US embargoes were lifted in 1978 and Turkey was relieved. In the 1980s, thanks to then Prime Minister Turgut Özal’s efforts, the Turkish company TUSAS (TAI- Turkish Aerospace Industry) created joint ventures with Lockheed Martin and General Electric to assemble and produce some parts of F-16s. Furthermore, FNSS, an armored vehicle producer, was established by Turkish Nurol Holding and British BAE Systems in Ankara in 1986. Another policy was to put offsetting clauses to tender agreements. Hence, if a supplier wanted to sell military equipment to the Turkish army, it had to get some parts produced by a Turkish company. This strategy is still effective and beneficial for the Turkish defense industry, and it is one of the reasons for raising Turkish producers' self-confidence concerning production as some components they were already producing.

In the 1990s, Turkey found another supplier, Israel, as an alternative to the West that imposed new embargoes that to be explained below. Turkey signed an agreement for military cooperation with Israel, by which it modernized its jets and outdated tanks. While Turkey reduced its dependence on the USA and Germany through the agreement, Israel found a new friend and market in the Middle East. However, the Turkish army was still 80% dependent on US-origin military equipment in the 1990s. While it received more than $6 billion during the Clinton administration, the average amount was $800 million annually (Gabelnick, Hartung and Washburn, 1999). With the new millennium, Turkey enlarged its vendor inventory and bought new weapons from new suppliers such as South Korea, the Netherlands, France, Russia, and Spain. But the USA was/is still the top supplier, providing 60% of Turkey’s total imports between 2014 and 2018. 60% might be a high percentage but it also means a 50% decrease since it was exceeding 90% in the 1970s. What is more, there is a decrease in weapon exports of other countries to Turkey since the Turkish army is supplying more than 70% of its needs from Turkish suppliers (BBC, 2019). In regards to weapons purchases made by Turkey, it was buying almost all its equipment except for uniforms and some rifles produced under German licensing. For example, all aircraft were of American origin. Tanks were American and German origin. Howitzers were German or Korean-made until they were produced in Turkey through technology transfer with South Korea. All guided munitions were again American-made. Combat helicopters were American while those for transportation were bought from France and Russia. Most of the weapons were outdated and received through donations. There are still US-granted grenades in army inventory remaining from the Second World War. In addition to absolute dependence, it was embarrassing for a nation that was proud of its army and history. While Ottomans conquered Istanbul with indigenous artillery in 1453, Turkey could not put its locally made rifle (MPT-76) in service until 2014.

The leap towards Indigenization started long before the AK Party government but no previous governments were so assertive and ambitious about it. The Erdogan-led government made it a national cause and launched the nationalization process of weapons. Turkey began to possess indigenous UAVs, helicopters, missiles, rifles and guided munitions thanks to the government's almost unlimited support to arms producers. Many such advanced weapons contain foreign parts but the percentage of Turkish parts increases day by day. The aim is to have a self-sufficient arms industry by 2053 so that it will no longer be worried whether suppliers will sell them arms or not (Donmez and Dogantekin, 2019). However, the bigger the projects are, the bigger the obstacles Turkey faces. Defense companies face more declared, undeclared and indirect sanctions than ever, and the Turkish government interprets it as deliberate actions to halt their defense projects. In addition to sanctions, excuses for not providing parts or selling weapons have changed. The next section will elucidate on all these in detail.

**Embargoes and Indigenous Weapons of Turkey**

Turkey became a NATO member due to the Soviet threat and to solidify that it was in the Western camp. However, in terms of security, the belief that NATO would protect Turkey in any circumstance as per Article 5 of the NATO agreement convinced the government that it would not need to invest in arms production. This comfort was jarréd by American President Johnson’s letter in 196, and led to disappointment and vulnerability against external threats after Turkey controlled one-third of Cyprus in 1974. US embargoes were a milestone for the Turkish state as weapons received from the USA via aid and procurements halted suddenly due to sanctions. However, embargoes were also a 'lessons learned' case since it compelled Turkey to redirect its focus on indigenous defense institutions, factories and weapons (Akman, 2016: 143; Zanotti and Thomas, 2019: 12; Stratfor, 2019). Embargoes continued for 42 months, aiming to force Turkey to leave the island. Yet, it only increased Turks’ resentment towards the
USA. Thinking that America’s attitudes were indecent, angered Turkish people collected money for the army, amounting to $600 million by 1986 (Durmaž, 2014: 52). On the other hand, the Turkish government tried to impede American operations by not allowing the USA to use Turkish bases and banning the deployment of missiles. Eventually, embargoes gave birth to Aselsan, Turkey's defense giant with a $3 billion turnover and $10 billion backlog orders (Aselsan, 2019). It was the 52nd largest defense company as per 2018 sales and is expected to be in the top 50 in upcoming years. The company is currently the engine of the Turkish defense industry, producing software, hardware and end products for Turkey and foreign countries. Inside most Turkish weapons, there is at least one basic item produced by Aselsan. In addition, electronic modernization of outdated weapons is being fulfilled by Aselsan.

In the 1990s, when the Gulf War started, NATO members reluctantly sent Patriots to Turkey to protect the country from Iraqi Scud missiles. Turkey had old Nike Hercules missiles but they were not capable of hitting Scuds. Saddam Hussein's regime did not attack Turkish territories but the excuse of NATO allies that the war was taking place in a region out of NATO's scope was a wake-up call for the Turkish government (Egeli, 2019: 72). The 1990s were also years when Turkey was in a dense war against PKK terrorism. When the Turkish army fought the terrorist organization on both Turkish soil and in Iraq, Germany and the USA imposed partial arms embargoes, arguing that these weapons were used against civilians. Besides, the USA made some cuts in military assistance, which angered Turks and eventually led them to return back the American assistance (Uslu, 2000: 221). Hence, Turkey turned to Israel for arms supplies and military modernization. Israelis had good ties with the Turkish army, and all communications and coordination were made through the military. Thus, the Turkish army bought munitions and weapons like Popeye air-to-surface missiles from Israel and granted tenders to Israeli defense companies for the modernization of F-4s, and Leopard and M-60 tanks (Kasapoglu, 2019: 3).

In the late 1990s, the USA did not want to sell military helicopters due to alleged human rights abuses in Turkey. It eventually sold them in 2002, ten years after the order (Slijper, 2017: 18). In other words, the Turkish army fought terrorism without helicopters during the most needed period. While procurements and modernization projects were continuing, Turkey also began co-produce some weapons in order to reduce the impact of embargoes from the year 2000 onwards. Hence, it found a new supplier and partner from the Far East: South Korea. Turkish army bought T-155 howitzers from South Korea in 2001 and began to produce them indigenously. The Turkish Air Force also bought KT-1 trainer planes from the Koreans in 2007. Yet, the biggest investment was to buy the technology of the Korean-made K2 tank for $400 million (Iddon, 2019). The uniqueness of cooperation with South Korea was that, unlike NATO allies, Koreans allowed technology transfer. As will be discussed below, leave aside expertise, Germany was reluctant to sell even the finished engine for tanks and howitzers. There were also undeclared embargoes for the sale of munitions as well, thus Turkey turned to Russia and bought Kornet anti-tank missiles from 2009 onwards. After a long R&D process dedicated to the production of such missiles, as of 2020, Turkey has been able to produce its anti-tank missiles indigenously and no longer needs to buy from foreign suppliers. Therefore, one more vital munition that was acquired from a non-NATO state became a locally produced weapon.

Actually and naturally, embargoes are imposed for relatively more expensive, bigger, mortal and advanced weapons, which are difficult to be supplied by non-Western countries except for Russia. For example, Turkey ordered ten unarmed Israeli origin Heron drones in 2006 but could not receive them until 2011. Yet, Ankara accused Israelis of sabotaging the drones and transferring footage to Israel (Farooq, 2019). Besides, five of them had an engine problem, two were without the chip for video recording, not all were able to climb to the desired altitude, and the service ceiling was shorter than claimed. (Yeni Safak, 2016). Eventually, the Turkish army removed all of them from service. In addition, the Turkish government wanted to buy armed drones from the USA in 2008 but the Congress did not allow their export (Tanis, 2015). In addition to the contention between Turkey and the USA, another reason was that Washington was concerned that armed drones could threaten Israel’s security (The Guardian, 2012). Therefore, Americans refused to meet Turkey’s requests for the security concerns of a non-NATO state. Ankara again opted for the indigenous production of drones and achieved it in the 2010s. Currently, state-owned TAI produces Anka and Akıncı; Baykar company has Bayraktar and Vestel company owns Karayel drones. Armed and non-armed versions are also exported to countries like Qatar, Ukraine, Saudi Arabia, Libya, and Azerbaijan. UAVs are one of the rare weapons whose parts are all produced in Turkey, including their engines. Turkey is now the second largest user of armed drones in the world.

The other conspicuous weapons that embargoes compelled Turkey to produce indigenously are surface-to-air (SAM) missiles. Turkey understood the importance of SAMs after the Gulf War in 1991. During the war, a few Patriot batteries were deployed to Turkish territories. Patriots were also deployed during the US invasion of Iraq in 2003 and when the Syrian civil war erupted in 2011 (together with Italian SAMP-T missiles). In fact, the Gulf
Defense Fund gave Turkey the opportunity to acquire US-made hardware in the 1990s but Turkey chose 80 F-16s instead of Patriot missiles (Egeli, 2019: 72). In 2008, Turkey asked the US to sell Patriots, but the Obama administration warned that the Congress might impede the sale. Turkey then conducted a bid to buy SAMs together with technology transfer in 2011. In 2013, the Turkish Executive Committee of Defense announced that the Chinese company CPMIEC won the tender. The US and NATO members criticized Turkey for buying missiles from a non-NATO country. In addition, there was the problem of interoperability with the NATO system. Mevlutoglu (2017: 287) says that defense officials admitted that they ignored political ramifications of the procurement. But since Turkey and China did not agree on the degree of technology transfer, the Turkish government gave up buying CPMIEC’s FD-2000 missiles.

As a result, Turkey decided to produce its indigenous missiles. The state-owned Roketsan began to work on Hisar low-medium-long range surface-to-air missiles, ranging from 5 km to 400 km. Hisar low-range successfully hit the target in October 2019. The Turkish Defense Minister announced that Hisar low and medium-range missiles would be in the army inventory in 2020. As for the more advanced and longer range of Hisar missiles, they are expected to be used by the Turkish army in 2021. On the other hand, while Turkish defense companies were struggling to produce local missiles, President Erdogan announced in 2017 that they would buy Russia’s S-400 missiles. The delivery took place in 2019 despite American objection. The main reason for turning to Russia to buy SAMs was Putin’s support of Erdogan after a failed coup attempt on July 15, 2016. Erdogan was disappointed with NATO members’ pro-coup statements. In addition, both Erdogan and Turkish people believed that the USA and NATO were behind the coup. What is certain is that no NATO members condemned the coup for a long time. Therefore, NATO was supposed to be the enemy that Turkey had to protect itself from, and thus Ankara knocked on the door of Moscow for S-400s. In case it operates S-400s, the US administration threatens Turkey with blocking delivery of F-35s, spare parts, and various other weapons like Chinook helicopters, modernization of F-16s, and imposing CAATSA sanctions (Kibaroglu, 2019: 8). The US officials claim that the S-400s cannot be connected to NATO’s system but Turkey already said they would be used separately (TRT World Research Center, 2019: 9). Despite threats, the Turkish government does not seem to be taken aback as it does not believe that the free flow of weapons from the USA will be secured if it listens to the Americans. Previous experiences indicate that the USA may find some other excuses in order not to deliver advanced weapons. For example, the first four F-35s produced for Turkey were threatened not to be delivered if Turkey did not release an imprisoned US pastor. Therefore, the USA seems to use the delivery of weapons as blackmail in any dispute.

In regards to other defense projects, where Western countries try to impede acquisitions of weapons through (un)declared sanctions, Turkey is trying counter these sanctions by producing its own fighter under the ‘TF-X project’. Since it has no previous expertise, it signed a design agreement with the British BAE Systems for £100 million Sterling (CSavunma, 2018). However, the biggest obstacle remains the engine as always. If it cannot find an engine, whether foreign or Turkish, the project might collapse. On the other hand, Turkey is trying to produce the main battle tank called, Altay, but it also has risks of delay due to engine problems. In addition, ATAK helicopters are produced for Turkish land forces but an export license for its engine has not been obtained in order to sell them to Pakistan (Gorgulu, 2019). Turkish authorities think that there is a shadow embargo concerning ATAK’s engine, the LHTEC T800-4A turboshift, which is produced by a joint venture between American Honeywell and the British firm Rolls-Royce (Bekdil, 2019b). In addition to the above weapons, Turkish-made howitzers could not be sold due to the absence of the export license of its engine. There are so many examples, but to show how embargoes are used as trump cards, we can give the example of the ban of Sig Sauer guns to Turkish police by the US Congress after a brawl between Erdogan's bodyguards and some protestors. In other words, the USA does not hesitate to ban the sale of guns to its ally.

Meanwhile, the role of Congress in the imposition of embargoes should be mentioned. The US Congress has drafted many embargoes since the Cyprus intervention of 1974 in spite of the opposition of US leadership. Since congressmen maintain their election campaign through donations, lobby groups donate enormous sums to affect their decisions. For example, the Greek lobby put pressure on US lawmakers after the Cyprus intervention while Israeli lobby did not allow the export of armed drones. The Times of Israel (2019) reports that Israel lobbied in Washington to block the sale of F-35 fighters to Turkey and drop it from production program in order to maintain its air superiority in the region. In addition, Armenian, Kurdish, Greek and FETO lobbyists, a group that attempted a failed coup in 2016, work hard to punish Turkey through the Congress. Turkey seems unable to respond to massive lobby activities directed to it. Besides wielding sanctions for punitive goals, they are also a tool to protect the economic interests of sanctioning countries. Turkey's defense exports exceeded $2 billion in 2019. This double-digit rise in exports means Turks are enlarging their share of the market as opposed to current exporters. Moreover, Turkey pursues an independent foreign policy in the region, and this policy causes a clash of interests
with other NATO members. To stop Turkey and bring it to terms, the USA and other NATO members impose punitive sanctions.

Yet, sanctions have not been helpful and they may fail in the future for a few reasons. First, Turkey feels threatened by its neighbors, and it is fighting against terrorism. If a country is under an existential threat, it will ignore any embargoes and circumvent them. The bigger the threat is, the more a country will buy or produce destructive weapons. Besides, Eley (2019: 70) says there are eight countries possessing missiles that can reach Turkey while six countries have cruise missiles. Since Turkey came to the verge of war with a few them in recent years, it has to have more sophisticated weapons that can defend the country. Second, as new technology enables countries to produce advanced arms and there are more countries ready for technology transfer, arms embargo cannot be a deterrent for a country to stop producing the weapons it needs. For example, Pakistan and India, despite being poor countries, could produce nuclear weapons. Third, Turkey should not be expected to terminate its arms projects. Neither has it planned to leave NATO. As Real-Pinto (2017: 307) states, it is inspired by the French experience of being capable of self-defense via homemade weapons. The French challenged NATO and the USA in the 1960s and finally achieved self-defense. In order to free itself from the domination of its allies and maximize its interests, Turkey will continue to conflict with NATO until accomplishing military self-sufficiency. Instead of contention, NATO should also try to accept Turkey as it is.

The Scramble for Engine Production

Engine is the most important component of any advanced weapons such as aircraft, missiles, tanks, and armored vehicles. This being the fact, a country can be self-sufficient in military terms only if it can produce engines as it is the most difficult piece to produce. The difficulty stems from its technology which is far ahead of that of any other component. A country might import them for their weapons but if it encounters embargoes, its production will pause. As for Turkey, defense companies are trying to produce arms with non-indigenous engines, but sometimes engine imports are stalled by the supplier, thereby halting production, and eventually, customers leave them. Currently, Turkish manufacturers are facing some undeclared embargoes concerning engines.

The following incidences highlight some of the issues regarding current sanctions. Concerning tanks, Turkey is trying to produce its main battle tank called Altay, a copy of the Korean K2 tank. The prototype was produced with the Rolls Royce owned German origin MTU engine, which can generate 1500 hp. MTU’s other versions are used in Turkey’s brand new ships under the project of national ship production called MILGEM (Defence Turkey, 2015). However, Germany is not eager to sell engines to Turkey for various reasons such as human rights abuses and Turkey’s incursions into Syria. Estimating that Germans may not provide MTUs, the tank producer (BMC) and the previous bidder Otokar had made simultaneous meetings with other suppliers like Mitsubishi, Caterpillar, and a Ukrainian state company. While Mitsubishi stipulated that tanks could be used only in countries of its choosing, the Ukrainian engine was not able to move a 65-ton tank (Vatan, 2017). Caterpillar also expressed interest but talks failed. In addition, the Turkish Tumosan company was awarded to produce an indigenous engine for Altay tank. Tumosan planned to produce it with Austrian company AVL List GmbH through technology transfer but Austrians rejected it, allegedly due to pressure from Germany. As of 2020, BMC plans to continue with MTU but according to Bekdil (2019a), Altay’s production program might be delayed a few more years since Germany is reluctant to share this critical technology over political concerns. Germans had also impeded the export of Turkish howitzers to Azerbaijan and Saudi Arabia by not selling MTUs. The Saudi’s order is rumored to be more than $1 billion (Star, 2019). On the other hand, Turkey got an order of twenty howitzers from Qatar in 2019 while it ordered twenty engines for howitzers from the Ukraine in 2018. Turkish newspapers claim that Ukrainian engines were purchased for Qatari howitzers. Defense analysts argue that this development may pave the way for the sale of howitzer to Azerbaijan as well. In addition, BMC is expected to introduce its 1000 hp engine in 2022, thereby there will no longer be an engine problem from that time onwards.

In fact, BMC has successfully tested a 600 hp engine and plans to develop another 380 hp engine for armored vehicles (MLS, 2019). Yet, to produce a 1500 hp version will take a longer time and experience (Anadolu Ajansi, 2018). In addition, Tumosan is developing an engine family ranging from 155 hp to 1000 hp. These sizes will be adequate for armored vehicles but not for tanks. As for missiles, Kale Motor company has developed KTV-3200, which will be used in indigenous missiles such as SOM (air-to-surface with 250+ range km) and Bora (surface-to-surface with 280+ km range) (CNN Turk, 2019). Their entry into service is expected to be in 2020. Furthermore, another state company SSTK is testing an engine for space rockets called Delta V. The engine uses hybrid fuel and is expected to be ready for service in 2020 (SS Dergilik, 2019). Overall, Turkey can produce engines for military vehicles, certain munitions, and missiles with a maximum range of 300 km. However, for bigger vehicles like tanks and missiles with ballistic versions, it should either buy ready-made engines or wait for engine producers...
to produce larger sizes. Since Western countries reluctantly sell engines, Turkish manufacturers may likely turn to Russia, China, Korea or another country capable of producing power plants with higher horsepower.

Nevertheless, the production of an aircraft engine is not possible by enlarging its scale. Moreover, Turkish producers have no small size aircraft engines to date. Currently, state-owned (TUSAS) undertakes aircraft production while its subsidiary TEI is responsible for developing their engines. TAI rolled out the first Sikorsky T-70 medium transport/utility helicopter for Turkish air forces in November 2019. The engine, T700-TEI-701D turboshaft (identical configuration for GE Aviation’s T700-GE-701D engine) was produced by TEI under a license from GE aviation. TEI has also produced PD170 diesel engine for its drones and Baykar's Bayraktar drone. It is the first drone engine produced in Turkey. TEI is also working on a turboshaft engine called TS1400 for military ATAK and civilian T625 Gokkey helicopters. It will be in service no earlier than in 2025 (Defence Turkey, 2019). Until that time, it will continue to be dependent on LHTEC T800-4A turboshaft engine of Honeywell-Rolls Royce. Dependency for the Turkish army's needs can be bearable, but TAI has also 30 ATAK orders from Pakistan. The Philippines is interested in the military attack helicopter as well. The USA refuses to give export authorization, which may lead to the cancellation of the Pakistani order (Gorgulu, 2019). TAI has contacted French and Polish engine producers but procuring desirable engines from them is less likely.

Finally, the Turkish defense industry is desperately trying to manufacture an engine for its indigenous fighter project, TF-X. The first foreign aspirant for engine production was Rolls Royce which formed a joint venture with Turkish Kale Motor in order to produce the engine in Turkey. Financial Times (2019) reported in March 2019 that the British firm would pull out of the engine supply bid due to disagreements over property rights. Rolls Royce maintained its interest, but the bid was won by TR MOTOR, a joint venture between BMC, TAI and SSTEK. In spite of the Turkish government’s encouragement of Rolls Royce to support TR MOTOR, the British manufacturer is yet to give its final decision. TAI says that F110 engines of General Electric will be used in the first four prototypes. Analysts argue that F110s, used in F-16 and F-15, are old-fashioned for a fifth-generation fighter. Actually, continuing with Rolls Royce engine is rational but Turkey's insistence on acquiring property rights makes it difficult for the engine producer to move ahead. Bringing such topics to the agenda at the beginning phases may backlash and lead to the collapse of the whole project. In addition, the project is too large in scope for Turkey to handle. Therefore, finding partner countries for the engine project may reduce costs and attract component suppliers.

Overall, Turkey's ambition to produce indigenous weapons is moving ahead at full speed and generally successful. While this article was written, Turkish companies introduced a tank carrier; an anti-tank missile deployed to a vehicle, an air-to-air missile, and tested a space missile running with hybrid fuel. Embargoes have hindered the defense industry but have not been able to stop them. If Turkey collaborates with non-Western companies, it can finish all projects but it runs the potential of becoming more disenfranchised from its NATO allies. The Turkish government prefers buying components and collaborating with Western defense companies when there are no sanctions. Yet, if sanctions continue and negatively impact the defense industry, they will probably turn to Russia, China, and other countries as they did for SAMs. Developments show that embargoes may cause a limp but will not stop Turkey's ambitions. What is more, the Turkish defense industry has built momentum and it seems unstoppable.

Conclusion

Arms embargoes have been ineffective during Turkey’s military operations conducted in Syria and locally against the separatist terrorism. In recent history, whenever there was a restraint, the Turkish government opted for the production of domestic weapons. From rifles to missiles, many weapons have been partly or fully Turkified and even exported. For instance, while it was one of the biggest importers of arms in the 1990s, it has entered the 2020s as the 14th biggest exporter of defense products. Thanks to locally manufactured military equipment, it is now able to supply more than 75% of its army’s needs. Because there is less dependency, the army's combat with terrorism changed so positively that it could paralyze the PKK militants in Turkish territories, and conduct two anti-YPG and one anti-ISIS operation in Syria from 2017 forward. The success shows that embargoes trigger Turkish ambitions about arms production. That is why the head of Turkish Defense Industries Directorate Ismail Demir thanked the US government for not approving the sales of weapons to Turkey since prohibitions led to the production weapons that are more indigenous. This study argues that NATO members insist on not selling weapons for political reasons and fear of losing export markets. Such undeclared embargoes put Turkish state and private defense industries into a wearsome situation since producers need components and know how to produce indigenous arms. However, embargoes also provoke and motivate them to work harder to grow the national
defense industry. The near future for the military industry looks difficult and dismal, but Turkey might be the winner of the contest in the long-term.

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