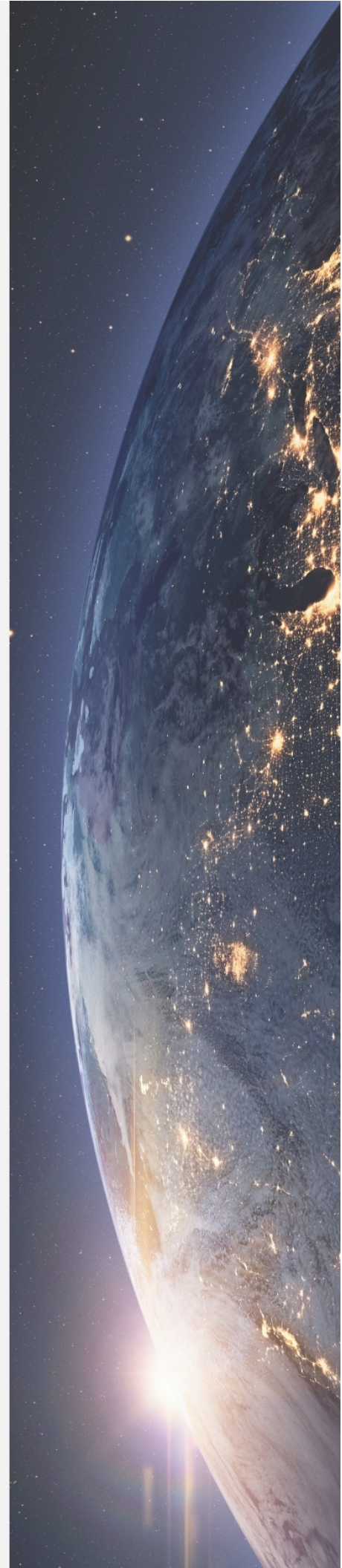


THE GLOBAL DEFENSE MARKET IN AN ERA OF TRANSFORMATION:

*A Strategic Analysis of
Türkiye's Role*

This study analyzes the ongoing transformation in the global defense industry, highlighting Türkiye's strategic position and potential within this new landscape. In light of geopolitical developments, technological advancements, and evolving security needs, the report evaluates Türkiye's role in both regional and global defense markets.



EXECUTIVE SUMMARY

The global defense sector is undergoing its most profound transformation since the end of the Cold War, driven by a dual shock of escalating geopolitical instability and a rapid technological paradigm shift. World military expenditure has surged to unprecedented levels, reaching \$2.718 trillion in 2024, fueled by major conflicts in Europe and the Middle East and a renewed era of great power competition. This surge in spending coincides with a fundamental change in the nature of warfare, as the industry pivots from a focus on heavy, hardware-centric platforms to an era defined by software, artificial intelligence (AI), and autonomous systems.

Amid this global flux, the Republic of Türkiye has emerged as a formidable and increasingly influential player in the international defense market. Its rise is not a recent phenomenon but the culmination of a decades-long, state-directed strategy aimed at achieving strategic autonomy. Catalyzed by crippling arms embargoes in the 1970s, Türkiye has systematically cultivated a sophisticated and resilient domestic defense industrial base. This ecosystem, comprising a mix of state-affiliated foundations, agile private enterprises, and a growing network of small and medium-sized enterprises (SMEs), has successfully transitioned from licensed production to the development of indigenous, combat-proven systems.

Turkish defense firms have become global leaders in specific high-technology niches, most notably in unmanned aerial vehicles (UAVs), and are now competitive across a wide spectrum of land, sea, and air domains. The country's defense and aerospace exports reached a record \$7.15 billion in 2024, a testament to the global appeal of its cost-effective, high-performance, and battle-tested products. This report provides a comprehensive analysis of these interconnected trends. It examines the evolution and current state of the global defense landscape, offers a detailed historical and strategic assessment of the Turkish defense industry's development, profiles its key corporate players, analyzes its export performance, and evaluates future trends, including the critical role of startups in sustaining innovation. The analysis demonstrates that Türkiye's journey from a dependent arms importer to a trendsetting exporter offers a compelling case study in national industrial strategy and provides a crucial lens through which to understand the future of the global defense market.

The defense sector is experiencing a fundamental shift away from traditional hardware-centric platforms toward a new paradigm defined by software, data, and speed. Key trends shaping the future battlefield include the proliferation of autonomous systems (UAVs, USVs) powered by Artificial Intelligence for superior intelligence and reconnaissance, and the establishment of space and cyber as critical warfighting domains. Furthermore, there is a major push for the digitalization of military operations through networked concepts like Joint All-Domain Command and Control (JADC2), which aims to connect sensors and shooters across all branches of the military to enable faster, more informed decision-making.

The startup ecosystem is now essential for driving this transformation, providing the agility and specialized innovation that larger, traditional defense contractors often cannot. Startups are at the forefront of developing "dual-use" technologies; innovations from the commercial sector with direct defense applications. They are leading in critical fields such as AI/ML for autonomous navigation and predictive analytics, next-generation cybersecurity, and the development of low-cost, resilient satellite constellations. By bridging the gap between commercial tech and military needs, startups are becoming indispensable partners in modernizing armed forces and maintaining a technological edge.

THE GLOBAL DEFENCE LANDSCAPE: A PARADIGM IN FLUX

To comprehend the current dynamics of the defense market, it is essential to first establish the macroeconomic and geopolitical context. The industry's present state is the product of a long historical trajectory, now accelerated by a confluence of global instability and a technological revolution that is fundamentally reshaping the character of modern warfare.

A Century of Evolution: From Industrial Warfare to the Digital Battlefield

The modern arms industry emerged in the second half of the 19th century, coinciding with the Industrial Revolution. This period saw the creation of the first large military-industrial companies, as nations like Great Britain, France, and Germany mastered the industrial-scale production of advanced weaponry such as breech-loading artillery, machine guns, and steel battleships. This marked a critical shift away from state-run arsenals toward a privatized, export-oriented model, where companies like Britain's Elswick Ordnance Company sold advanced systems globally.

The World Wars and the subsequent Cold War acted as powerful catalysts, massively scaling industrial mobilization and formalizing what President Dwight D. Eisenhower would later term the "military-industrial complex". This era was defined by an intricate, symbiotic relationship between governments and defense corporations, fueled by massive state-funded research and development (R&D) programs. During this period, arms transfers became a primary instrument of foreign policy for superpowers like the United States and the Soviet Union, which supplied weapons to proxy states worldwide.

The collapse of the Soviet Union in 1991 briefly ushered in an era of optimism and reduced military spending, often referred to as the "peace dividend". Global military expenditure reached a post-Cold War low in the late 1990s. However, this trend proved to be short-lived. Spending began to rise again in the 2000s, driven initially by the U.S.-led wars in Iraq and Afghanistan, and subsequently accelerated by the return of great power competition. The end of this "peace dividend" was not a gradual trend but a sharp and definitive reversal, directly caused by a confluence of specific geopolitical shocks. The primary catalyst for the current spending surge was Russia's full-scale invasion of Ukraine in 2022, an event that fundamentally reset the baseline for defense spending in Europe and beyond, creating a sustained, high-demand environment that is expected to persist for the foreseeable future.

The Contemporary Market: Geopolitical Tensions Fueling Record Expenditure

The current global security environment has driven military spending to its highest levels ever recorded. According to the Stockholm International Peace Research Institute (SIPRI), world military expenditure reached a historic **\$2.72 trillion in 2024**. This figure represents the tenth consecutive year of increases and, at 9.4%, the steepest year-on-year rise since at least 1988. This level of spending now accounts for 2.5% of the world's gross domestic product (GDP), with the per-person defense cost reaching its highest point since 1990 at \$334.

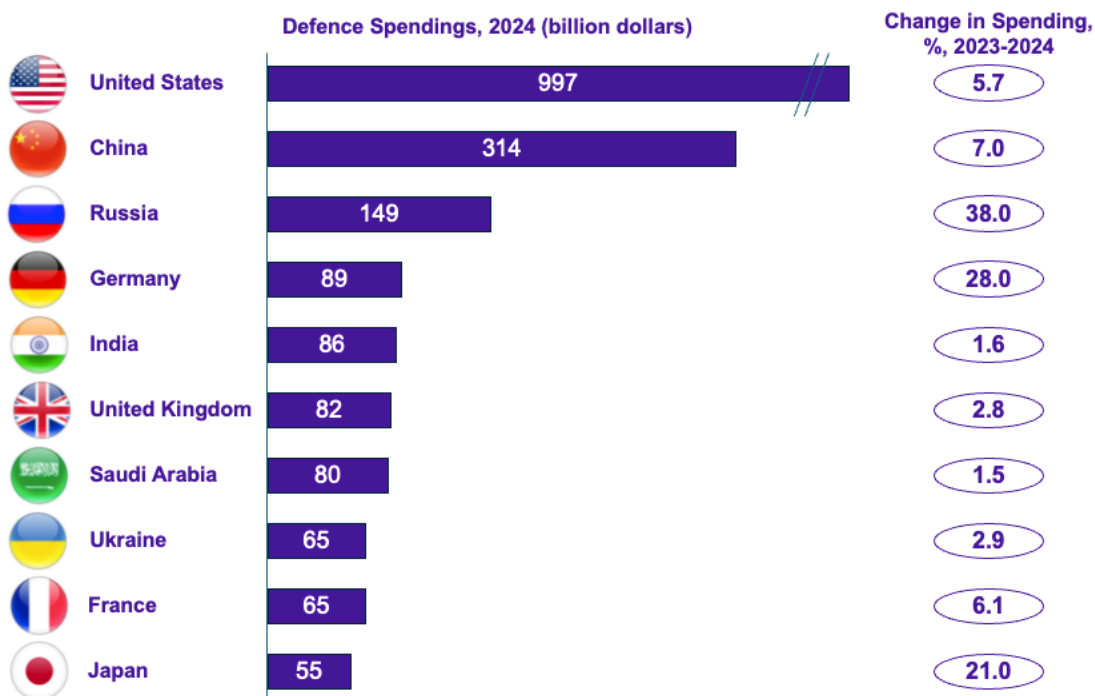
This unprecedented surge is a direct reflection of heightened geopolitical tensions. The primary drivers include the ongoing war in Ukraine, which has prompted massive spending increases

across Europe, and the war in Gaza and wider regional conflicts in the Middle East. For the second year in a row, military expenditure increased across all five of the world's geographical regions, signaling a widespread deterioration of the global security climate.

The market remains highly concentrated, with the top five spenders—the United States (\$997 billion), China (\$314 billion), Russia (\$149 billion), Germany (\$88.5 billion), and India (\$86.1 billion); collectively accounting for 60% of the global total. European spending saw a particularly sharp increase of 17%, while significant military build-ups continue in Asia and Oceania, driven by regional tensions. This demand is translating into industry growth, with the combined arms revenues of the **world's 100 largest defense companies reaching \$632 billion in 2023**, a 4.2% increase in real terms compared to 2022.

However, a notable lag exists between the sharp rise in government expenditure and the more modest growth in arms industry revenues. While government budgets can be increased rapidly by policy decisions, translating these funds into production and recognized revenue is a slower process, constrained by industrial capacity and supply chains. Major firms like Lockheed Martin and RTX have faced lingering supply chain challenges, indicating that 2023 revenues did not fully reflect the scale of new demand. This gap between committed funds and industrial output points to significant production backlogs, a vulnerability for established prime contractors but a clear opportunity for more agile manufacturers capable of scaling production more quickly to meet urgent needs.

The top 10 spending countries in 2024, their expenditure amounts, and the changes compared to 2023 are shown in the chart below:



The Technological Revolution: AI, Autonomy, and the New Rules of Warfare

Parallel to the geopolitical shifts, the defense industry is undergoing a technological revolution. A paradigm shift is underway, moving from heavy, hardware-defined platforms to lighter, smarter, and more software-driven capabilities. This transformation, described by industry analysts as a move "from steel to silicon," means that combat power is increasingly derived not from tonnage and firepower alone, but from technology, data, and algorithms. Nearly 90% of defense executives in North America and Europe report that military needs are shifting faster toward these software-centric systems.

The modern battlefield is being rewritten by a suite of disruptive technologies. Key among these are Artificial Intelligence (AI), which is being integrated into everything from predictive threat analysis to autonomous decision-making; unmanned systems, including aerial drones, robotic warships, and autonomous ground vehicles; and the growing domains of cyber and space warfare. The lines between these domains are blurring, creating a hyper-connected battlespace where satellites are military assets and cyber-attacks can be as destructive as missile strikes.

This technological pivot fundamentally alters the competitive landscape. While traditional defense is capital-intensive, requiring massive industrial infrastructure, the development of software, AI, and control systems has different economic and talent requirements. This has lowered the barriers to entry in critical sub-domains, creating an "adaptation gap" where established defense primes, often encumbered by bureaucratic speed and legacy product lines, struggle to keep pace. This gap is being exploited by agile, digital-native startups and firms from emerging industrial powers like Türkiye and South Korea, which are leapfrogging legacy systems with innovative, software-centric solutions. Consequently, the future of defense competition will be defined not just by industrial capacity, but by intellectual and digital capacity. This shift is forcing a strategic realignment across the industry, with a new emphasis on partnerships, supply chain resilience, and the integration of commercial technologies to stay competitive.

THE RISE OF THE TURKISH DEFENSE INDUSTRY: A QUEST FOR STRATEGIC AUTONOMY

The emergence of Türkiye's defense industry as a significant global competitor is not an accident of market forces but the deliberate result of a decades-long, state-directed policy born from profound geopolitical necessity. The industry's trajectory follows a clear causal chain: exposure to geopolitical vulnerability through arms embargoes created a strategic imperative for self-sufficiency. This imperative led to the institutionalization of a national industrial strategy, which in turn fostered the maturation of domestic firms that evolved from licensed production to indigenous design. The success of these indigenous products has now propelled Türkiye to a position of global competitiveness, where its defense exports have become a key instrument of its foreign policy.

Historical Foundations: From Ottoman Legacy to NATO's Frontline

The roots of Turkish arms manufacturing extend back to the Ottoman Empire, but the modern industry's foundations were laid in the early years of the Republic. Following its establishment in 1923, founder Mustafa Kemal Atatürk championed a vision of national self-reliance, leading to the consolidation of military factories and the encouragement of private sector pioneers. However, these early efforts were largely eclipsed by Türkiye's accession to NATO in 1952. While membership provided a critical security umbrella against the Soviet threat, it also fostered a deep dependency on foreign, particularly American, military hardware and technology, effectively integrating Türkiye into the "NATO defense market" and stalling further indigenous development.

The Turning Point: How Embargoes Forged a Path to Self-Sufficiency

The pivotal moment that irrevocably altered this trajectory was the 1974 Cyprus Peace Operation and the subsequent arms embargo imposed by the United States and other allies. This event was the single most important catalyst in the industry's history, as it starkly demonstrated the strategic vulnerability of relying on foreign suppliers for national security needs. The embargo served as a powerful lesson, forcing a fundamental policy reorientation toward self-sufficiency.

The direct consequence was a wave of institutionalization and industrial foundation-building throughout the 1970s and 1980s. This period saw the creation of the cornerstone companies of the modern Turkish defense industry, many established by military foundations that would later merge to form the Turkish Armed Forces Foundation (TAFF). Key players founded in this era include:

- **ASELSAN** (1975), focused on military electronics and communications.
- **HAVELSAN** (1982), specializing in software and systems integration.
- **ROKETSAN** (1988), tasked with developing missile and rocket technology.

To orchestrate this national effort, the government established the Undersecretariat for Defense Industries (SSM) in 1985, which has since been restructured as the Presidency of Defense Industries (SSB). The SSB became the central authority for defense procurement, policy, and

industrial development, providing the strategic direction and long-term vision necessary to build a self-reliant industrial base.

The Modern Powerhouse: The "National Technology Initiative" and Global Ambition

The progress made in the initial decades was dramatically accelerated by a second major policy shift. A 2004 meeting of the Defense Industry Executive Committee (SSİK) marked a definitive pivot away from off-the-shelf foreign procurement and toward maximizing domestic design, development, and production. This decision institutionalized the "**National Technology Initiative**" and set the stage for Türkiye's transformation from a client state to a global competitor.

This new policy drove the industry's maturation from licensed production of platforms like the F-16 fighter jet to the co-production and, ultimately, the indigenous design of sophisticated systems. This evolution is exemplified by flagship national projects such as the MİLGEM-class corvette, the T129 ATAK helicopter, and the globally recognized Bayraktar TB2 UAV. The results have been dramatic: the industry's annual turnover surged from approximately \$1.1 billion in the early 2000s to over \$15 billion in 2024, with the number of active defense projects growing from 62 to over 1,100. A key metric of this success is the high rate of domestic contribution, with the localization rate in defense projects now reaching 80%, a stark contrast to the near-total import dependency of previous decades.

Strategic Posture: A SWOT Analysis of Türkiye's Defense Sector

An analysis of the Turkish defense industry reveals a complex picture of significant strengths and opportunities, balanced by persistent weaknesses and external threats.

Strengths

- **Combat-Proven Products:** A key differentiator for Turkish systems is that they are not merely prototypes but have been extensively battle-tested in high-intensity conflicts in Syria, Libya, Nagorno-Karabakh, and Ukraine. This provides invaluable credibility and operational validation, particularly for UAVs and smart munitions.
- **Cost-Effectiveness and Agility:** Turkish firms have earned a reputation for producing high-quality, NATO-standard systems that are more cost-effective than their Western counterparts. They are also noted for their flexibility in meeting customer requirements and for faster delivery times.
- **Strong Government Support:** The industry is underpinned by a clear, long-term national strategy of self-sufficiency, driven and coordinated by the Presidency of Defense Industries (SSB), which ensures consistent political and financial support.
- **Integrated Industrial Ecosystem:** Türkiye has cultivated a diverse industrial base of over 3,500 companies, ranging from large prime contractors to a deep network of SMEs. This ecosystem is fostered by industrial clusters like SAHA Istanbul, which promote collaboration and supply chain resilience.

Weaknesses

- **Critical Subsystem Dependencies:** Despite achieving an 80% localization rate, the industry remains reliant on foreign suppliers for certain high-tech components, most notably engines for aircraft and naval platforms, transmissions, and advanced semiconductors. This creates a critical vulnerability to sanctions and export controls.
- **Financial and Economic Strain:** Sustaining a broad-spectrum defense industry with numerous ambitious and capital-intensive R&D projects places a significant strain on the national economy, particularly during periods of economic volatility.
- **Brain Drain:** The sector faces a persistent challenge in retaining top-tier engineering and technical talent, who are often attracted by more lucrative opportunities in the global private sector.

Opportunities

- **Growing Global Demand:** The unprecedented rise in global military spending creates a vast and expanding market for Turkish defense exports, as nations seek to modernize their arsenals.
- **Niche as an Alternative Supplier:** Türkiye is well-positioned to serve as a reliable, non-aligned defense partner for nations in Africa, Asia, and the Middle East that may face political constraints or high costs when attempting to procure systems from the US, Europe, or Russia.
- **Technology Transfer and Co-Production Model:** Türkiye's willingness to engage in joint ventures, technology transfer, and local production is a significant competitive advantage. This model is highly attractive to customer nations seeking to develop their own domestic industrial capabilities.

Threats

- **Geopolitical Volatility and Sanctions:** Türkiye's active and independent foreign policy, while creating markets, also exposes it to geopolitical friction. Shifting alliances and regional conflicts can lead to new sanctions or export restrictions from Western partners, impacting both critical supply chains and access to markets.
- **Intensifying Competition:** The global defense export market is increasingly crowded. Türkiye faces growing competition from other emerging defense powers like South Korea and Israel, as well as from established players.
- **Rapid Pace of Technological Change:** The defense industry is characterized by rapid technological obsolescence. Maintaining a competitive edge requires continuous, high-cost investment in R&D to keep pace with global trends in areas like AI, autonomy, and hypersonics.

CHAMPIONS OF TÜRKİYE: PROFILING THE KEY INDUSTRY PLAYERS

The backbone of Türkiye's defense industry is a collection of highly capable companies, each playing a distinct and strategic role within a deeply integrated national ecosystem. This ecosystem is not merely a group of siloed corporations; it functions as a synergistic whole. The electronic "nervous system"—including sensors, communication suites, and electronic warfare systems—is typically provided by ASELSAN. This core technology is then integrated into the advanced air, land, and sea platforms built by TUSAŞ, Baykar, FNSS, and naval shipyards, which are in turn armed with precision munitions and missile systems from Roketsan. This high level of domestic integration is a foundational strength, reducing reliance on foreign supply chains for complete weapon systems. Furthermore, the industry's unique ownership structure—a mix of foundation-owned entities (ASELSAN, TUSAŞ, Roketsan), state-owned enterprises (ASFAT, MKE), and dynamic private companies (Baykar, Nurol)—creates a powerful public-private dynamic. This model combines the long-term strategic direction and stable funding of state-aligned goals with the agility and export-driven focus of private enterprise.

ASELSAN: The C4ISR and Defense Electronics Giant

- **Overview:** Founded in 1975 to meet the communication needs of the Turkish Armed Forces, ASELSAN has evolved into Türkiye's largest defense electronics company. It is consistently ranked among the top 50 global defense firms and is majority-owned by the Turkish Armed Forces Foundation.
- **Business Areas:** ASELSAN's operations are structured across five primary business sectors: Communication and Information Technologies (HBT); Microelectronics and Electro-Optics (MEOS); Avionics and Guidance Systems (AGS); Radar and Electronic Warfare Systems (REHIS); Defense Systems Technologies (SST); and Transportation, Security, Energy, and Automation Systems (UGES).
- **Key Products & Projects:** The company's portfolio is vast and technologically advanced, encompassing military radios, tactical communication systems (TASMUS), a wide range of radar systems (e.g., KALKAN air defense radar, ALP early warning radar), sophisticated electronic warfare suites (e.g., KORAL), electro-optical targeting pods (ASELPOD), air defense systems (KORKUT, Hisar), naval combat management systems, and remote-controlled weapon stations.
- **Strategic Role:** ASELSAN serves as the national champion for high-technology electronics. It is the foundational pillar of the entire Turkish defense ecosystem, ensuring technological sovereignty in the most critical areas of modern warfare, including sensors, secure communications, guidance systems, and electronic warfare. Its subsystems are integral to nearly every major Turkish-made platform.

Turkish Aerospace Industries (TUSAŞ/TAI): Architect of Air and Space Power

- **Overview:** Established in its current form in 1973, Turkish Aerospace Industries (TUSAŞ, also known as TAI) is Türkiye's national center for aerospace technology. It specializes in the design, development, manufacturing, and lifecycle support of fixed-wing aircraft, helicopters, UAVs, and satellites.
- **Business Areas:** TUSAŞ is organized into several strategic groups aligned with its core missions: Aircraft, Helicopter, Unmanned Aerial Vehicle (UAV) Systems, Space Systems, and the flagship National Combat Aircraft (NCA) Group.
- **Key Products & Projects:** The company's most ambitious project is the KAAN, Türkiye's indigenous fifth-generation fighter jet, which represents the pinnacle of its aerospace aspirations. Other key indigenous platforms include the Hürjet advanced jet trainer, the Hürkuş turboprop basic trainer, the T129 ATAK attack helicopter (co-developed with Italy's Leonardo), the T625 Gökbey multirole utility helicopter, and the Anka family of MALE (Medium Altitude Long Endurance) UAVs. TUSAŞ is also a significant global supplier of aerostructures for major international programs, including Airbus (A320 family, A400M) and Boeing (737, 787).
- **Strategic Role:** TUSAŞ is the primary driver of Türkiye's ambition to become a top-tier aerospace power. Its projects are central to the national goal of reducing and eventually eliminating reliance on foreign combat aircraft and developing a full spectrum of sovereign air and space capabilities.

Roketsan: Precision Strike and Missile Dominance

- **Overview:** Founded in 1988 with the specific mandate to establish a national industrial base for missile technology, Roketsan is Türkiye's premier developer and manufacturer of a wide array of rockets, missiles, and precision-guided munitions.
- **Business Areas:** Roketsan's expertise covers land, air, and sea-launched missile systems, air defense missiles, tactical and short-range ballistic missiles, anti-tank guided missiles, and advanced guidance kits.
- **Key Products & Projects:** The company's extensive product range includes the ATMACA long-range anti-ship cruise missile, the SOM family of air-launched cruise missiles, the Hisar (low/medium altitude) and Siper (long-range) air defense missile systems, the Tayfun and Bora ballistic missiles, and the globally renowned MAM family of smart micro munitions, which have been decisively effective when deployed from UAVs. Roketsan is also at the forefront of advanced research, having recently unveiled the Tayfun Block 4 hypersonic missile and hard targets.
- **Strategic Role:** Roketsan provides the critical "sharp end" of Türkiye's military power. Its systems deliver the precision strike and standoff capabilities that are indispensable in modern warfare, forming a core component of the country's national deterrent posture.

Baykar: Redefining Modern Warfare with Unmanned Systems

- **Overview:** A privately-owned family company founded in 1984 as an automotive parts manufacturer, Baykar pivoted to unmanned aerial vehicle development in the 2000s. It has since become a global pioneer and a household name in the field of unmanned combat aerial vehicles (UCAVs).
- **Business Areas:** Baykar's activities are highly focused on unmanned systems, encompassing the entire value chain from R&D and platform design to C4I (Command, Control, Communications, Computers, and Intelligence) systems and the integration of artificial intelligence.
- **Key Products & Projects:** The company is world-renowned for its Bayraktar TB2 UCAV, whose effectiveness in multiple conflicts has reshaped modern tactical doctrines. Its portfolio of increasingly sophisticated platforms includes the Akıncı, a High-Altitude Long-Endurance (HALE) UCAV with strategic capabilities, and the developmental jet-powered Kızılelma, an unmanned fighter aircraft designed to operate from short-runway naval vessels. Other key projects include the naval-optimized Bayraktar TB3 and the Kemankeş mini intelligent cruise missile.
- **Strategic Role:** Baykar is the standard-bearer of Turkish defense innovation and agility. Its unprecedented success has not only equipped the Turkish Armed Forces with a game-changing asymmetric capability but has also established Baykar as Türkiye's single largest defense exporter and a powerful instrument of its foreign policy and "techno-diplomacy".

Havelsan: Digital Transformation and Command Dominance

- **Overview:** Founded in 1982 to meet the software and system needs of the Turkish Armed Forces, Havelsan has evolved into one of Türkiye's leading technology firms. The company's core mission is to develop and provide indigenous, high-tech, software-intensive solutions for both military and civilian sectors, establishing a dominant position in digital transformation.
- **Business Areas:** Havelsan's expertise spans a wide range of fields, including Command, Control, and Combat Systems; Simulation, Autonomous, and Platform Management Technologies; Homeland Security and Cyber Security; and Information and Communication Technologies.
- **Key Products & Projects:** The company is renowned for critical national projects such as the GENESİS and ADVENT ship combat management systems, the National Tactical Environment Simulation (MTÇS), and various flight simulators for platforms like the F-16. In recent years, it has gained prominence with its "Digital Troops" concept, featuring the BARKAN and KAPGAN unmanned ground vehicles, and the SANCAR armed unmanned surface vehicle.
- **Strategic Role:** Havelsan functions as the "digital backbone" of the Turkish Armed Forces and a key enabler of national technological independence. Its command control systems integrate disparate military assets, while its simulation technologies provide cost-effective and safe training. By pioneering unmanned and autonomous systems, Havelsan is shaping the future of Türkiye's operational capabilities and strengthening its position as a high-tech power.

The Land Systems Vanguard: BMC, Nurol Makina, and FNSS

- **BMC:** One of Türkiye's largest commercial and military vehicle manufacturers, BMC has a diverse defense portfolio. It produces a range of tactical wheeled vehicles and is particularly known for its Kirpi family of Mine-Resistant Ambush Protected (MRAP) vehicles, which are widely used by the Turkish military and have been exported. Crucially, BMC is the prime contractor for the serial production of the Altay, Türkiye's indigenous main battle tank.
- **Nurol Makina:** A subsidiary of the private Nurol Holding, Nurol Makina specializes in 4x4 tactical wheeled armored vehicles. Its main products include the Ejder Yalçın, a modular armored combat vehicle, and the NMS (Nurol Makina ve Sanayi) light armored vehicle, both of which have secured significant domestic and international orders.
- **FNSS Defence Systems:** A joint venture between Türkiye's Nurol Holding (51%) and the global defense prime BAE Systems (49%), FNSS is a leading manufacturer of both tracked and wheeled armored combat vehicles. Its product lines include the versatile PARS family of wheeled armored vehicles (in 4x4, 6x6, and 8x8 configurations) and the KAPLAN family of tracked armored vehicles, which includes a medium tank variant co-developed with Indonesia.

Other Key Actors

- **STM (Savunma Teknolojileri Mühendislik ve Ticaret A.Ş.):** STM operates as a systems engineering, project management, and technology consultancy firm for the Turkish state. It has developed a strong niche in naval platforms, contributing significantly to the MİLGEM national warship program and developing capabilities in submarine design and modernization. STM is also a leader in autonomous systems, producing the KARGU rotary-wing loitering munition, and offers advanced cybersecurity solutions.
- **MKE (Mechanical and Chemistry Industry Corporation):** As a long-standing state-owned enterprise, MKE is the primary domestic producer of a wide range of conventional armaments, including small arms, artillery systems, and various types of ammunition. It has recently been restructured and has entered the Defense News Top 100 list, reflecting its growing role and modernization.
- **ASFAT (Military Factory and Shipyard Management):** A state-owned company established to manage and leverage the capabilities of Türkiye's 27 military factories and 3 naval shipyards. ASFAT acts as a prime contractor, particularly in the naval domain, and has been highly successful in securing major export contracts for warships and providing modernization services.

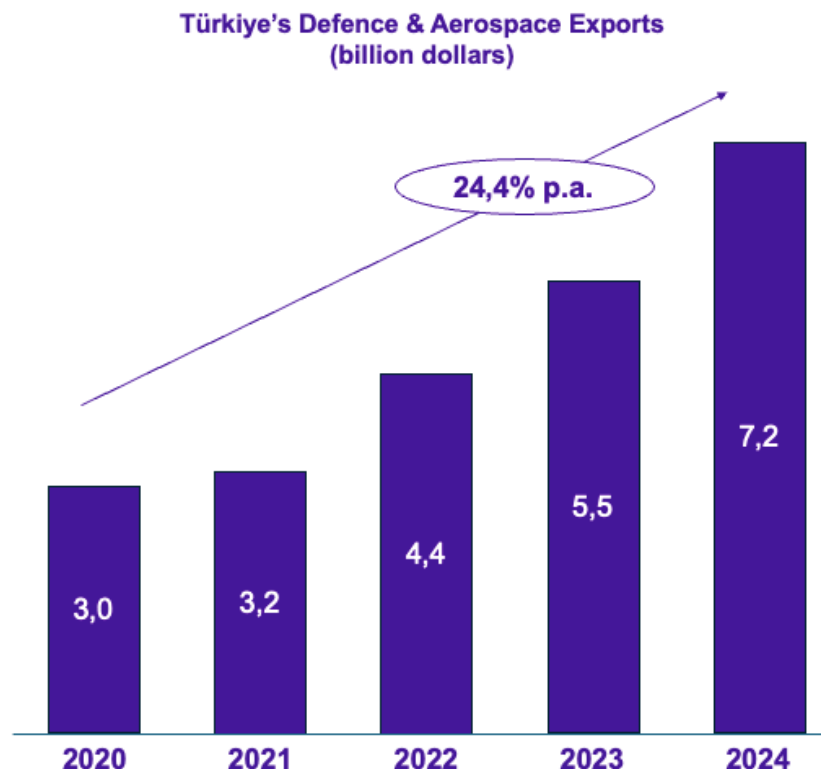
TÜRKİYE ON THE WORLD STAGE: AN ANALYSIS OF DEFENSE EXPORTS

Türkiye's transformation into a major defense exporter is one of the most significant developments in the global arms market over the past decade. This success is not merely a commercial achievement; it is a direct outcome of its national strategy for self-sufficiency and an increasingly vital tool of its foreign policy. The combat-proven effectiveness of Turkish systems, particularly in recent high-profile conflicts, has served as the most potent form of marketing, creating a strong "demand-pull" from nations worldwide. The battlefield has effectively become the showroom for Turkish defense technology.

Export Performance: A Decade of Unprecedented Growth

The growth in Türkiye's defense and aerospace exports has been exponential. From a modest \$248 million in 2002, the sector's export revenue climbed to a record **\$5.5 billion in 2023**. This momentum continued with a further surge to an all-time high of **\$7.15 billion in 2024**, representing a remarkable 29% increase over the previous year. This performance has solidified Türkiye's position among the world's leading arms suppliers. According to SIPRI data, Türkiye ranked as the world's 11th largest arms exporter in the 2020–2024 period, having increased its defense exports by 103% compared to the 2015–2019 period. The industry now exports over 230 different products to more than 180 countries, showcasing a broad and diversified market reach.

Turkey's defense & aerospace export data from 2020 to 2024 is shown in the chart below:



Mapping the Market: Key Export Destinations and Strategic Partnerships

Türkiye's export market is geographically diverse and strategically significant. While the industry has historically strong ties with nations in the Middle East (such as Qatar, the UAE, and Saudi Arabia) and with Turkic states in Central Asia, its market has expanded dramatically. A crucial development is the growing penetration into European and NATO markets. In 2024, Europe was the top export region, accounting for 27% of the total, followed by the United States at 25%. Combined, NATO member countries comprised over 50% of Türkiye's defense exports. This success in highly demanding markets serves as a powerful global validation of the quality and interoperability of Turkish systems, acting as a "seal of approval" that enhances their credibility worldwide. Africa and Southeast Asia, particularly nations like Indonesia and Malaysia, have also emerged as key growth markets.

A cornerstone of Türkiye's export strategy is its flexible and partnership-oriented approach. Rather than focusing solely on direct sales, Turkish firms frequently offer packages that include technology transfer, joint ventures, and local production agreements. This model is highly appealing to customer nations that wish to build their own domestic industrial capacity and reduce their long-term dependency. Notable examples include a joint production deal for EREN 4x4 tactical vehicles in Malaysia and a preliminary agreement for 48 KAAN fifth-generation fighters with Indonesia, which includes significant industrial collaboration.

Combat-Proven Platforms: Leading Products in the Global Market

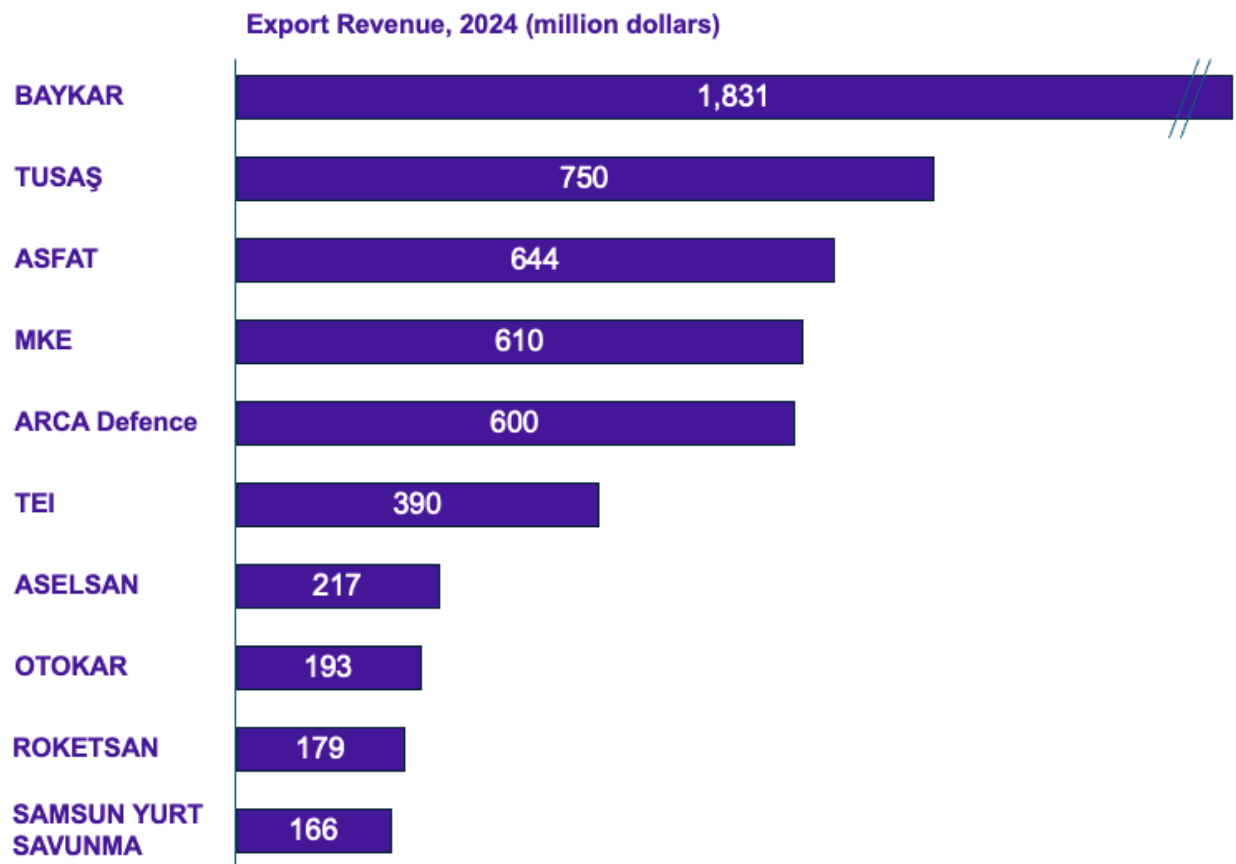
The diversity of Türkiye's export portfolio reflects the maturity of its industrial base. The leading product categories in the global market include:

- **Unmanned Aerial Vehicles (UAVs):** This is the undisputed flagship category. The global success of Baykar's Bayraktar TB2 (exported to 34 countries) and the more advanced Akıncı (exported to 10 countries) has made Türkiye synonymous with drone warfare innovation. UAVs and their associated smart munitions from Roketsan are consistently among the most exported products.
- **Naval Platforms:** Türkiye has achieved significant success in naval exports, leveraging the capabilities of its state-managed and private shipyards. Key exports include MİLGEM-class corvettes to Pakistan and Ukraine, and a recent deal for frigates with Indonesia. ASFAT has been instrumental in securing these large-scale naval contracts.
- **Land Vehicles:** A wide range of armored vehicles from manufacturers like BMC (Kirpi MRAP), FNSS (PARS family), and Nurol Makina (Ejder Yalçın) are in service with dozens of countries across the Middle East, Africa, and Asia.
- **Other Systems:** The export portfolio is rounded out by a variety of other systems, including munitions and missiles, advanced weapon systems, helicopters, and radar systems, demonstrating the breadth of the industry's capabilities.

The Export Champions: Company-Specific Contributions to Türkiye's Global Reach

While the entire ecosystem contributes to export success, a few companies stand out as the primary drivers. The rise of Baykar, a privately-owned company, as the nation's top exporter signals a potentially significant evolution in the Turkish defense model. While the large, foundation-owned companies were crucial in building the industrial base, the agility, commercial focus, and singular product vision of a private entity have proven exceptionally effective in capturing global markets. This success may influence future industrial policy to further empower private sector leadership in export-oriented ventures.

Listed below are the top 10 Turkish companies by export value in 2024, along with their corresponding amounts:



The data clearly shows the dominant position of Baykar, which alone accounts for over a quarter of Türkiye's total defense exports and derives more than 90% of its total revenue from foreign sales. This contrasts with the more balanced domestic and international revenue streams of the large foundation-owned companies like TUSAŞ and ASELSAN.

THE FUTURE OF CONFLICT: ANTICIPATED TRENDS IN THE DEFENSE SECTOR

The defense market is on the cusp of another technological leap, with the next decade poised to be defined by a new generation of disruptive capabilities. As nations look beyond the current paradigms of warfare, investment and R&D are increasingly focused on technologies that promise to deliver decisive advantages in speed, stealth, intelligence, and lethality. Analyzing these global trends and Türkiye's positioning within them is crucial to understanding the future competitive landscape.

Global Megatrends: Hypersonics, Directed Energy, and Quantum-Safe Security

Analysis from industry experts identifies several game-changing imperatives that will shape the defense sector leading into 2025 and beyond. These represent the next wave of disruptive technology:

- **Hypersonic Technologies:** The development of offensive and defensive systems capable of operating at speeds greater than Mach 5 is a top priority for major military powers. Hypersonic missiles, with their combination of extreme speed and maneuverability, threaten to render most current air and missile defense systems obsolete, creating a race to both deploy and counter them.
- **Directed Energy Weapons (DEWs):** Laser and high-power microwave systems are transitioning from experimental concepts to deployable assets. DEWs offer the potential for low-cost-per-shot engagement, making them an ideal solution for countering massed, low-cost threats such as drone swarms and rockets.
- **Space-Based Systems:** Space is increasingly recognized as a critical warfighting domain. Nations are expanding their deployment of satellites for resilient communication, persistent intelligence, surveillance, and reconnaissance (ISR), and early warning for missile threats.
- **AI Co-Pilots and Human-Machine Teaming:** The integration of AI is moving beyond data analysis to become an active partner for human operators. AI co-pilots in combat aircraft, intelligent decision aids for commanders, and the seamless teaming of manned and unmanned platforms are set to revolutionize combat effectiveness and reduce human cognitive load.
- **The Digital Fourth Front and Quantum Threats:** Beyond physical domains, the digital battlefield—encompassing cyber and electronic warfare—is now a central front. A looming future threat is the advent of quantum computing, which possesses the theoretical capability to break the classical encryption standards that secure virtually all military and government communications. This has spurred an urgent, albeit nascent, effort to develop quantum-safe cybersecurity solutions to protect sensitive data and ensure digital sovereignty.

Türkiye's Next Moves: Specialization in Autonomous Systems and Niche Technologies

The Turkish defense industry is not merely observing these trends but is actively investing in and developing capabilities aligned with this future vision. This effort is guided by official strategic documents, including the National Artificial Intelligence Strategy (2021-2025) and the SSB's Sectoral Strategy Document (2023-2027), which explicitly prioritize emerging and disruptive technology (EDT) areas like quantum computing, nanotechnology, and directed energy weapons. This demonstrates a coherent, top-down strategy to future-proof the industry.

Specific Turkish projects show a clear alignment with global megatrends:

- **Hypersonics:** Roketsan is at the forefront of Türkiye's efforts in advanced missile technology, highlighted by the development and unveiling of the Tayfun Block 4, a ballistic missile with hypersonic capabilities.
- **Autonomous Systems and AI:** Türkiye is building on its world-leading experience in UAVs to develop more complex autonomous systems. This includes the "Otonom Kol Uçucusu" (OKU) or "Autonomous Wingman" program, which pairs unmanned platforms like TUSAŞ's jet-powered Anka-III with the Super Şimşek high-speed drone to operate alongside manned fighters. This move from producing individual platforms to developing complex, network-centric *systems of systems* represents a significant leap in doctrinal and technological sophistication. The proliferation of Unmanned Ground Vehicles (UGVs) from companies like Otokar, Havelsan, and Katmerciler, and HAVELSAN's development of secure, closed-loop AI systems like MAIN, further underscore this focus.
- **Directed Energy:** In a prime example of ecosystem collaboration, Roketsan and FNSS have jointly developed the ALKA-KAPLAN, a hybrid-powered armored vehicle equipped with Roketsan's ALKA directed energy weapon system. This platform is specifically designed to provide a mobile, cost-effective defense against drone swarms and other asymmetric threats.

This strategic focus on developing asymmetric, lower-cost, high-tech systems—such as advanced drones, loitering munitions, and DEWs—can be seen as a direct response to the prohibitively high cost of competing with major powers in traditional domains like fifth-generation manned aviation. It represents a deliberate strategy of innovation-driven asymmetry, aiming to achieve a competitive advantage by leapfrogging legacy platforms and investing in disruptive technologies where Türkiye can excel without matching the defense budgets of global superpowers.

THE INNOVATION ENGINE: STARTUPS AND DEFENSE TECHNOLOGY

The long-term dynamism and resilience of the Turkish defense industry will depend not only on its established prime contractors but also on its ability to cultivate a vibrant, bottom-up innovation culture. As the global defense landscape is increasingly disrupted by agile, tech-focused startups, fostering a domestic ecosystem that supports these new entrants is a critical strategic imperative.

The Global Rise of the Agile Defense-Tech Startup

Globally, the traditional defense procurement model is being challenged by a new wave of venture capital-backed startups. These companies, often originating from the commercial tech sector, specialize in areas like software, AI, data analytics, and autonomy. Their agile development methodologies and innovative business models allow them to outpace the slow, bureaucratic procurement cycles that often hinder established defense primes, making them attractive partners for governments seeking rapid capability enhancements.

Fostering a Domestic Ecosystem: The Role of SAHA Istanbul and Teknoparks

Türkiye has proactively sought to build an environment where such innovation can flourish. This effort is a deliberate government strategy to solve the "SME integration problem" that plagues many national defense industries. By creating formal structures for SMEs and startups to connect with prime contractors and access resources, the government is building a deeper, more resilient, and more innovative industrial base. Two institutions are central to this strategy:

- **SAHA Istanbul:** Established as Türkiye's defense, aerospace, and space cluster, SAHA Istanbul has grown to become the largest industrial cluster in Europe. It comprises over 1,400 member companies, of which a significant majority (64%) are SMEs, along with 29 universities. Its core mission is to increase the domestic production rate by facilitating B2B connections between primes and suppliers, supporting R&D, and running targeted initiatives like the SAHA Girişim program for high-tech entrepreneurs and the SAHA Academy for workforce development.
- **Teknopark Istanbul:** Positioned as a "Deep Technology Center," Teknopark Istanbul is a joint initiative of the SSB and the Istanbul Chamber of Commerce. It hosts over 300 R&D-focused companies, creating a dense innovation hub where major players like ASELSAN, TUSAŞ, and Roketsan maintain offices alongside a thriving community of startups. The technopark's close ties to universities in Istanbul facilitate crucial collaboration between academia and industry, accelerating the transition of research into viable products.

High-Potential Verticals for Turkish Startups

The structure of the modern defense market creates numerous opportunities for agile startups to excel in specific high-growth verticals:

- **AI and Software:** As warfare becomes increasingly data-driven and software-defined, startups specializing in AI algorithms for ISR data analysis, target recognition, predictive maintenance, and command-and-control decision support have immense potential. These ventures align perfectly with the global "steel to silicon" trend and have lower capital requirements than hardware-focused enterprises.
- **Autonomous Systems and Robotics:** While developing entire unmanned platforms is a complex undertaking, startups can carve out critical niches by developing the enabling technologies. This includes advanced software for autonomous navigation, sensor fusion algorithms, and control systems for swarm intelligence, applicable to air, land, and sea drones.
- **Cybersecurity:** The digitalization of the battlefield has made cybersecurity a non-negotiable requirement. Türkiye's National Cyber Security Strategy (2024-2028) explicitly emphasizes the development and use of domestic technologies, creating a protected and growing market for local startups that can provide innovative solutions for network defense, data encryption, and threat detection.
- **Advanced Materials and Manufacturing:** Startups focused on novel materials, such as lightweight composites and advanced armor, or on disruptive manufacturing techniques like 3D printing for rapid prototyping and on-demand spare parts, can fill crucial gaps in the supply chain and enhance the performance of larger systems.

Governmental Support and the Path to Commercialization

The Turkish government, primarily through the SSB, plays a vital role in nurturing this innovation ecosystem. While direct grants to startups are less common in defense than in other sectors, the government's strategy of funding R&D through prime contractors, who then subcontract to SMEs and startups within the technoparks, creates a powerful trickle-down effect. The Defense Industry Support Fund provides the high-level financial backing for these national projects. This defense-tech ecosystem is further bolstered by Türkiye's broader startup scene, which is one of the most vibrant in the region, having produced multiple unicorns and decacorns and attracting significant venture capital investment. This mature environment provides access to capital, talent, and mentorship that defense startups can leverage.

For these startups to achieve long-term success and sustainability, developing "dual-use" technologies will be increasingly critical. A company whose technology has applications in both defense and commercial markets—for example, an AI-powered computer vision system that can be used for both military target recognition and industrial quality control—can build a more resilient business model. This approach de-risks the company by diversifying its customer base beyond a single government client and allows it to tap into the faster-moving, larger commercial market, making it more attractive to private investors and less dependent on slow government procurement cycles.

STRATEGIC OUTLOOK & CONCLUDING ANALYSIS

The global defense industry has entered a new and defining era. The return of great power competition and the proliferation of regional conflicts have ended the post-Cold War "peace dividend," ushering in a period of sustained and historically high military expenditure. Simultaneously, a technological revolution centered on data, AI, and autonomy is fundamentally reshaping the tools and doctrines of warfare, creating new opportunities and challenges for industry players.

Within this dynamic landscape, the Republic of Türkiye has successfully executed one of the most remarkable national industrial transformations of the past half-century. Driven by a clear strategic imperative for self-sufficiency, Türkiye has methodically built a defense ecosystem that is not only capable of meeting the vast majority of its own military's needs but has also become a highly competitive force in the global export market. Its success is built on a foundation of consistent state support, a synergistic relationship between large prime contractors and a deep network of SMEs, and a focus on developing indigenous, combat-proven technologies.

Türkiye's key strengths lie in its ability to offer cost-effective, NATO-standard systems that have been validated in real-world combat. Its leadership in unmanned systems, in particular, has allowed it to set global trends and has become a powerful tool of its foreign policy. The industry's flexible, partnership-oriented export model, which often includes technology transfer and local production, provides a significant competitive advantage, especially in emerging markets.

However, the path forward is not without challenges. The industry must address persistent dependencies on foreign suppliers for critical high-tech components, a vulnerability that could be exploited through sanctions. The immense financial cost of sustaining a broad-spectrum industrial base and funding ambitious R&D projects will continue to place a strain on the national economy. Furthermore, retaining top engineering talent in the face of global competition remains a critical task.

Looking ahead, the interplay between geopolitical forces, technological innovation, and national industrial strategies will continue to shape the global defense market. Türkiye is well-positioned to navigate this future. Its ongoing investments in next-generation capabilities, such as hypersonic missiles, directed energy weapons, and complex autonomous systems, demonstrate a clear understanding of emerging trends. The continued cultivation of its innovation ecosystem through clusters and technoparks will be vital for maintaining its technological edge.

Ultimately, Türkiye's journey from a dependent arms importer to a globally recognized producer and exporter offers a powerful blueprint for other nations seeking strategic autonomy. Its ability to balance state direction with private sector agility, to leverage geopolitical challenges into industrial opportunities, and to translate battlefield experience into sought-after products will ensure that it remains a significant and influential player in the international defense arena for the foreseeable future.