

# The Billion-Dollar Battlefield: How Defense Industry is Reshaping Global Strategy

**Complutense Finance Society**

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# Introduction

The global arms industry is experiencing unprecedented growth, driven by geopolitical instability, military modernization, and strategic defense initiatives. In response to perceived threats and alliance commitments, nations are significantly increasing their defense budgets.

***The United States continues to dominate the global arms export market, accounting for 42% of total exports between 2019 and 2023.***

France and Russia follow with 11% each, while China (5.8%) and Germany (5.6%) complete the top five. Together, these nations represent 75% of all arms exports, highlighting the industry's high concentration. In Europe, the trend is shifting toward high-value procurement and greater investment in research and development. In 2024 alone, EU defense procurement is projected to exceed €90 billion, with R&T investment reaching €5 billion.

The sector remains dominated by large corporations—particularly in the U.S.—with Lockheed Martin, RTX Corporation, and Northrop Grumman generating tens of billions in arms revenues. Their influence reflects a defense sector increasingly defined by advanced technology and strategic economic weight.

As NATO members strive to meet or exceed the 2% of GDP defense spending target—with discussions of raising this benchmark to 3% or even 5%—the economic ramifications of increased military expenditure have become a central policy concern.

***Increasing European defense spending from just under 2% to 3.5% of GDP would result in an estimated €300 billion annual cost.***

Historically, defense-related R&D has led to significant breakthroughs in areas like aerospace, cybersecurity, and artificial intelligence, with spillovers into the civilian sector—including innovations such as the Internet, GPS, and various medical technologies. These outcomes highlight defense spending's potential to boost long-term economic competitiveness. However, these benefits must be weighed against other critical needs, as increased defense spending may divert resources from areas like infrastructure, education, and healthcare. Policymakers face tough decisions on balancing national security with broader economic priorities, especially in times of fiscal constraints. In societies facing significant social challenges, the opportunity cost of defense spending can be particularly high, requiring careful consideration of all public needs.

## Defense Spending Policies and Budgets

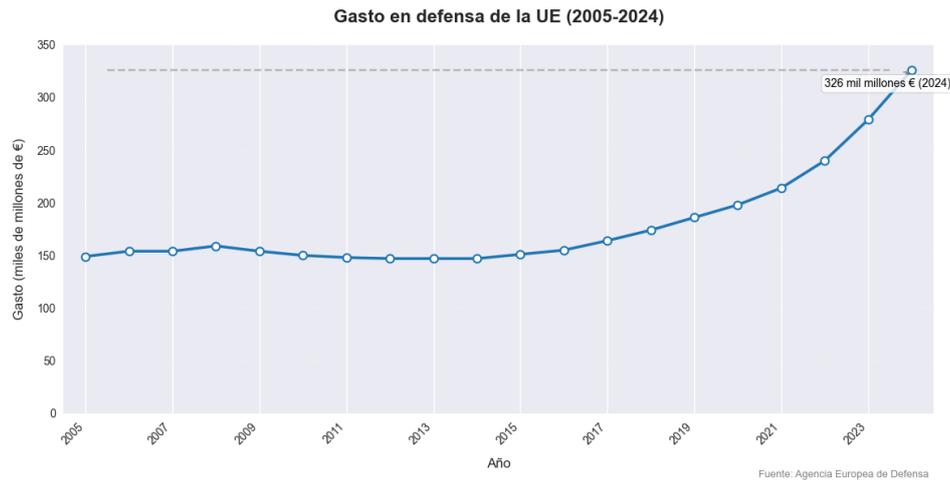
### Impact of the War in Ukraine on Defense Spending in Europe

Since the annexation of Crimea in 2014 and, especially after the full-scale invasion of Ukraine in 2022, Europe has seen a significant increase in defense spending. The perceived threat from Russia has reshaped security policies across the continent, driving substantial budget increases in many countries.

The Stockholm International Peace Research Institute (SIPRI) notes that military spending in Europe has been rising steadily since 2014 but accelerated sharply after 2022.

***In 2023, European defense spending reached €552 billion, marking a 16% increase compared to 2022 and a 62% surge since 2014.***

This budgetary escalation reflects the strategic realignment undertaken by numerous European governments in response to the war in Ukraine.



Countries closest to Russia and Ukraine have seen the most dramatic spending hikes due to heightened threat perceptions. Poland, for instance, has raised its defense expenditure to historic levels, allocating 3.9% of its GDP in 2024. Nations like Finland and the Baltic states have also significantly bolstered their military budgets and accelerated the modernization of their armed forces.

From a geopolitical standpoint, the war in Ukraine has been a turning point for European security. NATO has reinforced its eastern flank, and the European Union has pushed for investment programs in the defense industry to reduce reliance on the U.S. and strengthen its capacity to respond to future threats. The paradigm shift in European defense policy is clear, and current trends suggest that defense spending will continue to rise in the coming years.

## Evolution of Defense Spending in Europe

### Germany

Following Russia's invasion of Ukraine, Germany has significantly increased its defense spending. In 2024, the total budget reached €90.6 billion, of which €52 billion came from the regular budget and €20 billion from the special €100 billion fund approved in 2022. Thanks to this increase, the country has fulfilled NATO's commitment to allocate 2% of GDP to defense. In particular, resources have been focused on acquiring key equipment such as F-35A fighter jets, frigates, and Patriot missile systems. However, starting in 2027, with the end of the special fund, Germany is expected to raise its regular budget by €30 billion annually to maintain the same level of spending.

### France

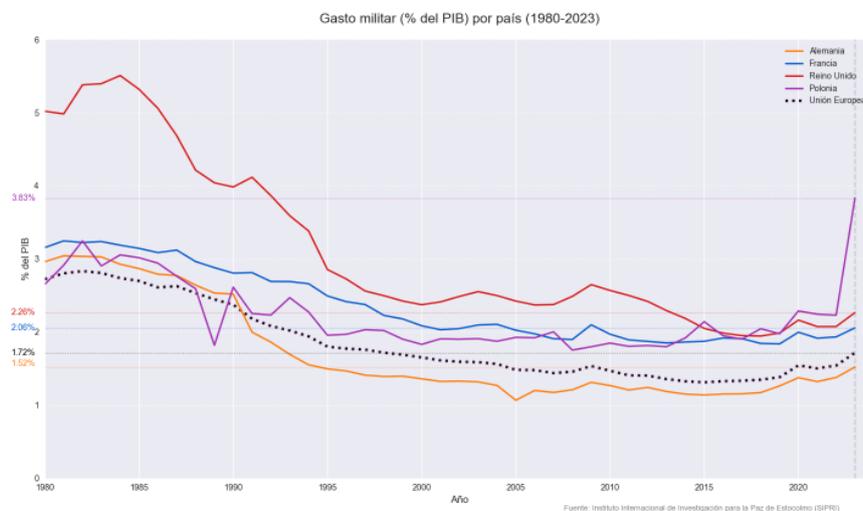
France has gradually increased its defense spending, rising from €51.314 billion in 2022 (1.93% of GDP) to €58.041 billion in 2023 (2.06% of GDP). Looking ahead to 2025, spending is expected to rise to 3.5% of GDP. On a per capita basis, spending reached €850 in 2023, marking an increase of €96 compared to the previous year. In addition to these increases, France has launched key projects, such as the reactivation of the Luxeuil-Saint-Sauveur Air Base, which will host squadrons of Dassault Rafale jets. This €1.5 billion investment strengthens its nuclear deterrence capabilities and consolidates its position as a military power in Europe.

## United Kingdom

The United Kingdom government has announced a significant increase in defense spending, which will rise from 2.3% to 2.5% of GDP by 2027—an annual increase of approximately £13.4 billion. This boost will be financed through a cut in development aid, which will drop from 0.5% to 0.3% of GDP. According to Prime Minister Keir Starmer, this increase is a response to growing global insecurity and aims to strengthen the country's national defense. In this regard, it is the most substantial adjustment since the end of the Cold War, and it underscores the importance the UK places on NATO as the central pillar of its defense strategy.

## Poland

Lastly, Poland has substantially raised its defense spending, reaching 4.2% of GDP in 2024, the highest percentage within NATO. However, in December 2024, spending was reduced to 3.8% due to budgetary adjustments and limitations in advance payments. Despite this drop, Poland remains the NATO country with the highest proportional defense expenditure. That same year, it acquired K9 self-propelled howitzers and Homar-K rocket launchers, financed through a €1 billion loan. Looking to 2025, it plans to increase spending to 4.7% of GDP, further reinforcing its focus on modernizing its armed forces.



## EU Defense Strategy

### European Defense and Cooperation Plans

The EU is moving toward greater strategic autonomy through initiatives such as the European Defence White Paper – Readiness 2030 and the ReArm Europe Plan, which promote investment in military capabilities and integration among Member States. Defense spending reached €800 billion in 2023, driven by the war in Ukraine. Priorities include addressing critical shortfalls, strengthening the defense industry, improving interoperability, and enhancing military mobility—especially along the borders with Russia and Belarus.

### Financial Instruments and Reforms

To accelerate these objectives, the EU has launched the SAFE instrument, which will mobilize up to €150 billion in defense-related loans. In parallel, the Stability and Growth Pact's escape clause will be activated, allowing spending to increase up to 1.5% of GDP for four years. The

European Investment Bank (EIB) will boost support for military projects, while the Capital Markets Union will facilitate private capital flows into the sector.

## Key Initiatives

One of the European Union's key defence initiatives is the European Defence Fund (EDF), which has been allocated €7.953 billion for the 2021–2027 period to support military research and development.

***In 2025 alone, €1.591 billion was dedicated to this effort, with €391 million directed toward research and €1.2 billion toward development.***

Since its launch, the EDF has funded 170 projects, including major undertakings such as the Future Combat Air System (FCAS) and the development of modular corvettes. Complementing this initiative is the European Intervention Initiative (EI2), a defence cooperation platform aimed at enabling rapid crisis response and enhancing the EU's collective operational capabilities.

## Industrial Impact and Outlook

The EDF aims to reduce sector fragmentation, foster interoperability, and facilitate SME access through the EUDIS scheme. In 2025, 33 themed calls were launched focusing on critical technologies such as AI, cybersecurity, and missile defense.

With EU defense spending reaching €289 billion (1.6% of GDP) and 12 countries surpassing NATO's 2% threshold, the EDF is solidifying its role as a cornerstone of European military modernization. A sustained increase in the budget is expected during the 2028–2034 cycle, reinforcing continental security in an increasingly volatile geopolitical environment.

## Essential raw materials for military industry

According to NATO, there are twelve raw materials that are essential for production in the defense industry. While each of these materials serves distinct functions across various military applications, they are all critical and complementary in ensuring the effectiveness of modern defense systems.

Among the most important, aluminum is crucial for producing lightweight, high-performance aircraft and missiles. Graphite enhances the structural integrity and stealth of tanks, corvettes, and submarines. Cobalt is essential for superalloys used in jet engines and missile systems, while beryllium is valued for its role in advanced electronics and targeting systems. Gallium and germanium are central to semiconductors, communication devices, and night vision technology. Lithium powers rechargeable batteries used in modern military equipment. Rare earth elements, due to their magnetic properties, are critical in guided missiles, radar systems, and computer components. Materials like titanium, platinum, manganese, and tungsten contribute to armor, structural components, and ammunition.

## Is there dependence on China in the supply chain?

The production of the aforementioned raw materials is concentrated in a few countries, with China being the dominant player.

***China is the world's leading producer of aluminum (59%), gallium (80%), germanium (60%), graphite, rare earth elements (70%), and tungsten (83%).***

In contrast, the United States leads in beryllium production (60–70%), while the Democratic Republic of the Congo supplies around 70% of the world's cobalt. In the case of lithium, Australia is the top producer (46.3%), followed by Chile (23.9%) and China (17.2%), with Argentina and Brazil also emerging as notable suppliers. Manganese production is mainly concentrated in South Africa (30%), Australia (16–17%), and Gabon (16%). For platinum, South Africa again dominates with approximately 70% of global output, followed by Russia and Zimbabwe. Titanium minerals are primarily extracted in Australia, South Africa, and Canada.

This high dependence on China for strategic materials poses potential vulnerabilities and geopolitical tension. To mitigate these risks, NATO and its allies are working to diversify supply sources and boost domestic production to ensure a steady supply of these critical resources.

## **Which are the main armament manufacturing countries?**

To identify the key players in the global arms industry, we can analyze each country's arms export as a proxy indicator. The United States and France are the dominant forces in global arms exports.

***Between 2014–2018 and 2019–2023, the U.S. increased its exports by 17%, while France saw a significant rise of 47%.***

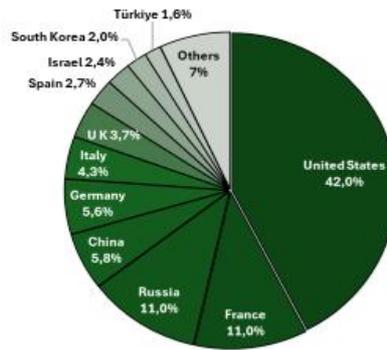
During the 2019–2023 period, the U.S. was responsible for 42% of total global arms exports, supplying weapons to 107 countries—more than any other major exporter. France's growth was driven primarily by the sale of fighter jets to India, Qatar, and Egypt.

For the first time, France surpassed Russia to become the world's second-largest arms exporter. In contrast, Russia experienced a dramatic decline. Its exports dropped by 53%, and the number of recipient countries fell from 31 in 2019 to just 12 in 2023. A significant portion of French arms exports (42%) went to countries in Asia and Oceania, while 34% was delivered to Middle Eastern nations.

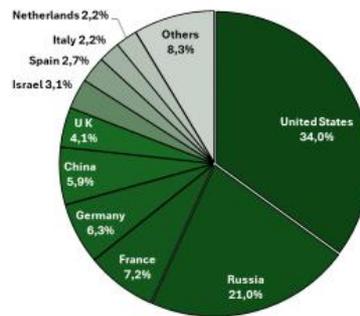
***European countries nearly doubled their arms imports between 2014–2018 and 2019–2023, with an increase of 94%.***

This surge was largely fueled by transfers to Ukraine, which alone accounted for 23% of the region's imports, according to the Stockholm International Peace Research Institute (SIPRI).

Share of global arms exports (%) 2019–23



Share of global arms exports (%) 2014–18



## How Have Oil Prices Evolved Over Time?

Since 2015, oil prices have followed a highly volatile path, shaped by fluctuations in supply and demand as well as geopolitical tensions. Between 2015 and 2020, prices dropped from \$100 to below \$30 per barrel, driven by a surge in U.S. shale production and Saudi Arabia's strategic decisions. This decline benefited European importers by reducing logistical costs, but negatively affected major producers like Russia, limiting their defense spending.

***From 2020 to 2022, the COVID-19 pandemic caused an unprecedented demand shock, sending WTI prices plummeting to -\$37 per barrel in April 2020.***

A swift recovery followed, spurred by OPEC+ production cuts and the war in Ukraine, pushing Brent crude to \$120 per barrel by June 2022.

Between 2023 and 2025, prices stabilized. In 2023, the average was \$83 per barrel, dropping to \$78 in December and reaching \$71.94 as of March 18, 2025 — a 1.58% increase. This relative stability reflects a fragile balance, maintained by voluntary OPEC+ cuts of 2.2 million barrels per day through December 2024, with a gradual output increase planned from April 2025 onward.

## Impact on the Defense Industry

Oil prices significantly influence the defense sector. Logistical and operational costs — particularly for troop and equipment transport, which rely heavily on petroleum-based fuels — doubled during the 2022 price peak. Current levels of \$67–72 per barrel provide some relief, though future increases could strain extended military operations. Oil is also a critical input in weapons manufacturing, serving as a base for plastics, lubricants, and explosives. In 2022, high prices squeezed profit margins for European arms producers, while the recent stabilization has allowed renewed investment, especially in emerging technologies like

drones.

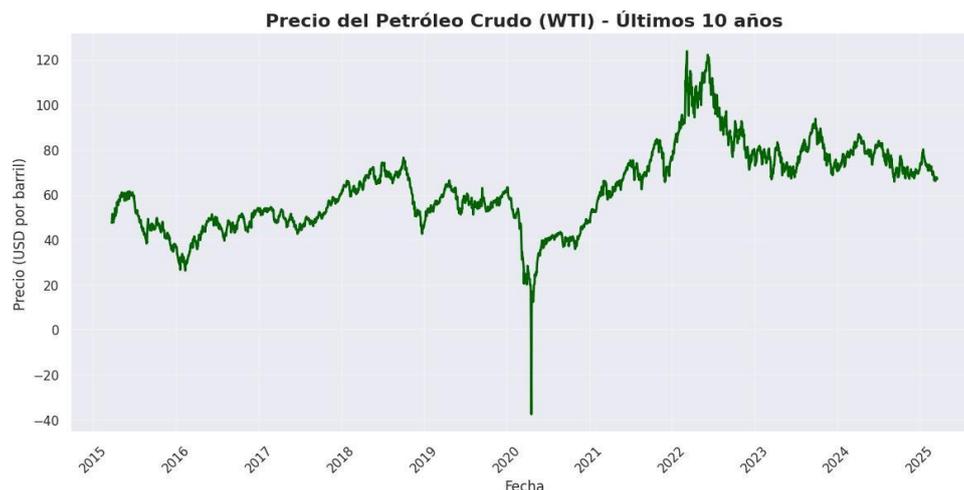
From a geopolitical standpoint, oil revenues are essential to defense funding for producers like Russia and Saudi Arabia. The 2015–2020 price slump weakened Russia’s defense posture, while the 2022 rebound significantly boosted its war capabilities. In contrast, Europe — heavily reliant on imports — has sought to diversify its energy sources. Price volatility has also accelerated innovation in alternatives such as electric drones, although petroleum dependence remains entrenched in the short term.

## How Will Oil Prices Evolve in the Coming Years?

Currently, OPEC+ is maintaining voluntary cuts of 2.2 million barrels per day, in place since October 2022 and extended through March 2025.

***Starting in April 2025, production is set to increase gradually by 138,000 barrels per day.***

Looking ahead, the group may maintain cuts if global demand remains weak, potentially driving up military logistical costs. Alternatively, production could ramp up under political pressure — especially from U.S. President Donald Trump, who since returning to office in January 2025 has advocated for lower oil prices to weaken Russia and reduce defense expenditures. Expansion is another possibility, with new entrants like Uganda — which began oil exploration between 2024 and 2025 — potentially diluting existing production quotas. Additionally, a crisis in the Middle East could prompt renewed cuts, driving prices higher and significantly impacting the defense sector.



## Europe's strategic reliance on ASML for advanced chip manufacturing

ASML, a Dutch company and global leader in semiconductor equipment, is the only manufacturer in the world capable of producing extreme ultraviolet (EUV) lithography machines, which are essential for producing the world’s most advanced microchips (below 2 nanometers).



***This unique position has made it one of Europe's most valuable companies, with its market value increasing over 400% in the last five years.***

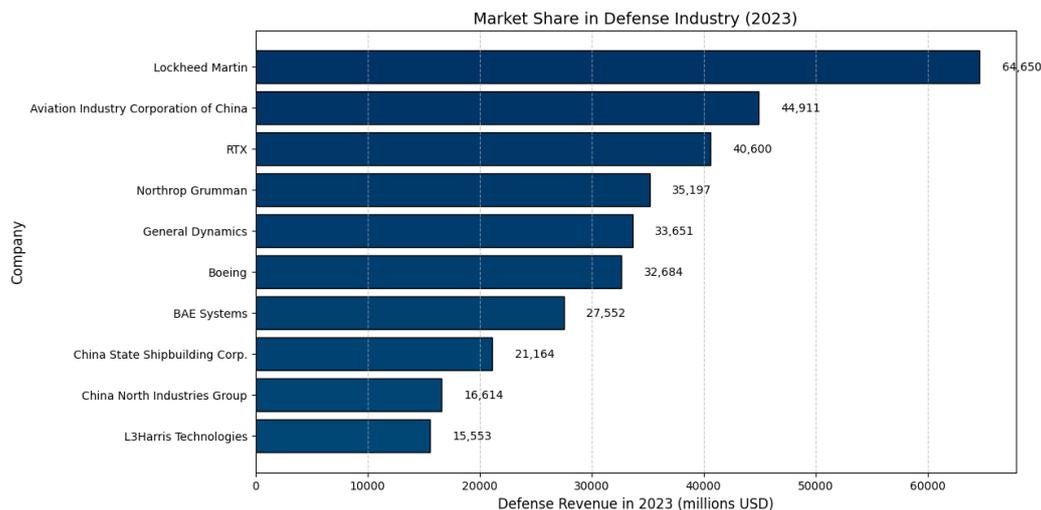
Its technology is crucial for leading chipmakers like TSMC and Samsung, and by the end of 2023, ASML had an order backlog of nearly €10 billion. Despite its dominance, the company now faces two main risks: the potential relocation of its production outside Europe in order to attract qualified talent, and the emergence of new competitors in the sector.

Now, it appears that Canon is aiming to break into ASML's territory. Canon's system, in development for the past two decades, takes a different approach than ASML's. Instead of using extreme ultraviolet light, it employs a nanoimprint method that significantly reduces both cost and energy consumption, with an estimated starting price of around €15 million per unit. The process is said to consume up to 90% less energy than EUV lithography technology. The key difference lies in the fact that it doesn't use light to etch the wafers, but rather a form of imprinting. The Japanese company claims its technology can already produce 5 nm chips and could eventually reach the 2 nm level, a domain currently dominated by ASML.

However, this new method also comes with challenges. Nanoimprinting is a slower process and potentially has higher error rates, which could affect its viability on a large scale. Moreover, in next-generation semiconductor manufacturing, nanometer scale is not the only factor that matters, transistor density is also crucial, and it will be this factor that determines the real competitiveness versus ASML's technology.

## **How the Defense Industry Supplies and Strategizes**

The defense industry is undergoing a process of accelerated transformation, driven by changes in military spending, technological advances, and new operational strategies. Industrial consolidation has been a key factor in the sector's evolution, reshaping the competitive structure of the global defense market. Over the past decades, this process has led to the creation of large conglomerates that dominate the industry today, such as Lockheed Martin, Raytheon and Northrop Grumman.



However, beyond the concentration of companies, trade in defence technologies, government demand, and international cooperation play a decisive role in shaping the market. Business strategies have evolved to adapt to an environment where multi-domain operations, supply chain resilience and the transformation of military training are key.

At the same time, the emergence of new technologies such as AI, autonomous systems and cyber warfare are redefining modern conflict and national capabilities. The sector's future will be shaped by how these technologies are traded, how firms consolidate, and how international partnerships evolve—particularly Europe's push for greater strategic autonomy.

## The Role of SMEs

The role of small and medium-sized enterprises (SMEs) in the defense industry has evolved significantly in recent years. Traditionally seen as low value-added subcontractors, they are now playing a more strategic role—especially those focused on high-value technology niches.

***Many of these companies come from the civilian sector, bringing innovation and flexibility.***

This shift is partly driven by the adoption of the "servitization" model, which favors output-based service contracts (OBC). This approach fosters more dynamic and collaborative relationships between companies and clients—critical in an industry where partnerships tend to be long-term.

As defense technologies grow more complex and less centralized under direct government control, SMEs contribute to both cost efficiency and innovation. However, concerns remain about their long-term reliability, which affects contracting strategies—often resulting in shorter lead times or performance-based agreements.

***In Europe, around 2.500 SMEs are involved in defense, playing a vital role in supply chains.***

While industrial integration offers economies of scale, Europe's slower consolidation compared to the U.S. could limit the broader impact of SMEs across borders.

## Defense as a Service (DaaS)

Defense as a Service (DaaS) is an emerging model in the defense sector that allows armed forces to access advanced capabilities, such as satellite communications or ISR systems, through subscription based services, rather than owning and maintaining the infrastructure themselves. This approach reduces acquisition costs, ensures continuous system upgrades and maintenance, and provides flexibility to scale resources according to operational needs.

## **International Collaboration and Cooperation**

The joint development of weapon systems helps reduce costs and boost demand in the defense industry.

***By sharing projects, countries can lower unit costs and access technologies they might not develop alone.***

However, challenges such as national protectionism and strategic sovereignty concerns often arise. Governments prioritize their own industries to protect sensitive technologies and jobs. Technical issues, like mismatched requirements, can cause delays and cost overruns, as seen with projects like the Eurofighter and A-400M. Within the EU, market fragmentation and budget constraints hinder cooperation, despite tools like the European Defence Fund (EDF). Many Member States avoid joint tenders to retain control over national production, and external pressures, such as from the U.S., complicate consensus within the EU.

## **Government Demand and Strategic Priorities**

Governments are shifting defense priorities to address a more complex security environment. Key goals include enhancing coordination across land, air, sea, space, and cyber domains, strengthening international partnerships, securing supply chains, and modernizing training using AI and VR technologies. These priorities are explained below in more detail.

### **Multi Domain Operations (MDO)**

Modern defense strategy is evolving toward Multi Domain Operations (MDO), an approach that seeks effective and coordinated integration of military capabilities across operational domains: land, maritime, air, space and cyber. Hybrid warfare, which includes cyber attacks, disinformation campaigns and irregular combat, is becoming increasingly prevalent, making MDO provide an essential integrated framework for defense. Military forces are increasingly dependent on cross-domain coordination to maintain a strategic advantage over adversaries. The ability to control and operate across multiple domains is becoming a fundamental requirement for modern defense forces. This implies the need to invest in technologies and systems that enable interoperability and seamless communication between different military branches and operational domains. Companies offering solutions that support multi-domain capabilities are expected to experience an increase in demand for their products and services in the coming years.

### **Supply Chain Resilience**

Ensuring supply chain resilience is now a top priority for governments due to its impact on military readiness and strategic autonomy. Disruptions caused by geopolitical tensions, economic shifts, or pandemics can severely affect defense capabilities. To address this, strategies like AI-based logistics, blockchain, and domestic production of key materials are being adopted.

There thus arises a need for visibility across the supply chain that is critical to identifying and mitigating potential risks. This involves having a clear understanding of where materials are sourced, how components are manufactured and how final products are transported. Diversification of supply sources is also crucial to reduce dependence on a single supplier or region, mitigating the impact of potential disruptions.

In December 2024, NATO emphasized this priority by publishing a list of 12 critical raw materials for defense, including rare earths, titanium, lithium, and tungsten.

## **Training Transformation**

Military personnel training is undergoing a transformation driven by the integration of emerging technologies such as AI and VR, which offer scalable and immersive solutions to optimize skills development and force readiness. Key trends in training transformation include AI-based adaptive training systems or Virtual Reality combat simulators.

## **New Technologies in Modern Warfare**

### **Artificial Intelligence**

Artificial Intelligence (AI) is enhancing intelligence, surveillance, and reconnaissance (ISR), as well as transforming C4ISR systems through advanced sensors and data analytics. It is also central to the development of autonomous systems—such as drones, ground vehicles, and underwater vessels—which increase efficiency and reduce risk. AI is improving training with adaptive systems and realistic VR simulations, supporting decision-making, logistics, and cybersecurity in increasingly complex environments.

### **Advanced Weapon Systems**

Prominent within this category are hypersonic weapon systems, which offer unmatched speed and penetration capability, as seen in Russia's Avangard and the U.S. The proposed U.S. Defense Budget for fiscal year 2025 includes provisions for missiles, which could encompass the development or acquisition of hypersonic systems. Directed energy weapons (DEW), designed for missile defense and anti-drone operations, have also evolved significantly. Finally, biotechnological innovations are exploring their potential in battlefield medicine and human performance enhancements.

### **Cyber and Space Warfare**

Cyber and space warfare have become crucial components of modern military strategy due to the growing digitalization and interconnectivity of defense systems. By 2025, major progress is expected in cybersecurity through initiatives like the Cybersecurity Maturity Model Certification (CMMC), the integration of quantum encryption, and enhanced protection of critical infrastructure such as command centers and satellite networks.

***The use of AI in cybersecurity is enabling faster responses to increasingly sophisticated threats, prompting significant investments—including \$14.5 billion in the U.S. defense budget.***

At the same time, space is becoming a vital operational domain, with advancements anticipated in satellite-based ISR, missile early-warning systems, space traffic management, and electronic warfare to counter hostile satellites. Programs like NATO's DIANA and growing

investments by countries like the U.S., UK, France, and India reflect the strategic importance of space, where future defense capabilities will play out across multiple domains.

## **Unmanned and Autonomous Systems**

Unmanned and autonomous systems are rapidly transforming modern warfare and are expected to play a critical role by 2025. These include unmanned aerial vehicles (UAVs), now widely used for surveillance, combat, and logistical support, reducing risk to personnel. On land, unmanned ground vehicles (UGVs) are deployed for high-risk missions, while at sea, unmanned surface vessels (USVs) and autonomous underwater vehicles (AUVs) are enhancing naval intelligence, surveillance, and mine countermeasure capabilities. Programs like DARPA's Sea Hunter demonstrate the strategic potential of these technologies in expanding operational reach with minimal human intervention.

## **AI in Defence: Strategic Transformations in EW and NATO's Cybersecurity Architecture**

The integration of artificial intelligence (AI) into electronic warfare (EW) and cybersecurity is redefining the nature of modern conflict. In today's battlespace, dominance over the electromagnetic spectrum (EMS) is no longer just a tactical advantage. NATO's evolving defence doctrine emphasizes AI-driven systems to counter increasingly complex threats, particularly in the context of hybrid warfare and algorithmic espionage. This transformation reflects both a continuation of historical trends and a significant technological leap forward.

## **Historical Evolution of Electronic Warfare and Signal Dominance**

The historical evolution of electronic warfare (EW) dates back to the U.S. Civil War (1861–1865), where both Union and Confederate forces disrupted telegraph communications. The Boer War (1899–1902) saw the first military use of electromagnetic deception, with British forces using searchlights for Morse signaling, countered by Boer jamming attempts. World War II marked significant advancements, such as the British "Window" chaff system that degraded German radar, and German Würzburg radar, which was eventually countered by Allied jamming.

The Cold War's arms race led to innovations like anti-radiation missiles, such as the AGM-45 Shrike, which targeted Soviet SAM sites during the Vietnam War. These milestones highlight the importance of adaptive signal processing for EW superiority—a capability significantly enhanced by AI's machine learning frameworks today.

## **The Transformational Impact of AI on Modern EW Operations**

Modern EW, augmented by AI, operates along three main pillars. In Electronic Attack (EA), reinforcement learning algorithms allow jamming systems to adapt in real time, as seen in Ukraine's Pitbull system, which autonomously suppressed 89% of targeted drone communications. In Electronic Protection (EP), neural networks now detect and neutralize spoofing and interference more effectively than traditional systems, significantly improving radar accuracy. Electronic Support (ES) leverages deep learning to process massive volumes

of signals intelligence (SIGINT) data in real time, enabling dynamic mapping of the EMS, a capability demonstrated during NATO's Steadfast Jupiter 2024 exercises.

## **NATO's AI driven Cybersecurity architecture**

Parallel to advances in EW, NATO has overhauled its cybersecurity architecture.

***Under the 2024 Cyber Defence Pledge, the alliance allocated €23.6 billion toward AI-enhanced capabilities.***

This includes the development of an AI Common Operational Picture (COP), which uses federated learning across member states to detect zero-day threats with 92% accuracy. NATO has also implemented quantum-resistant cryptographic protocols, like QR-TLS 1.3, dramatically accelerating post-quantum security adoption. Projects like AEGIS now integrate cyber and EW operations using neuromorphic processors that deliver both energy efficiency and computational power.

However, this rapid technological evolution also presents critical challenges. Adversarial machine learning attacks have exposed vulnerabilities in AI systems—such as data poisoning, which reduced the accuracy of NATO's Sentinel IDS system during cyber exercises. The emergence of quantum computing, particularly breakthroughs from China's Jiuzhang 3.0 platform, poses existential threats to encryption infrastructure. In response, NATO's Tallinn Manual 3.0 now mandates ethical safeguards, including explainable AI (XAI) and human oversight in lethal EMS operations.

On the industrial side, market concentration is emerging as a strategic risk. U.S. and Chinese firms dominate key sectors, with Lockheed Martin's HADES suite and China's SMIC chips forming the backbone of many NATO systems.

***The European Defence Fund's €4.9 billion AI sovereignty initiative aims to diversify this base, but still lags behind U.S. and Chinese advancements.***

## **Major Defense Agreements and Contracts**

Agreements between governments and the private firms have become a central pillar in shaping the future of the defense industry. A single awarded contract can redefine a company's trajectory, ensuring not just the delivery of systems, but long-term revenue from maintenance, upgrades, and innovation. This explains the intense competition among major firms, which often invest years in proposals, prototypes, and R&D to secure these deals. Many companies are now specializing in niche segments or positioning themselves as essential links in broader supply chains.

Beyond their military function, these agreements act as platforms to anticipate technological trends, mobilize private investment, and align state interests with industrial innovation. In a 2025 marked by escalating geopolitical tensions and unprecedented technological acceleration, the military industry is not just expanding, it is transforming.

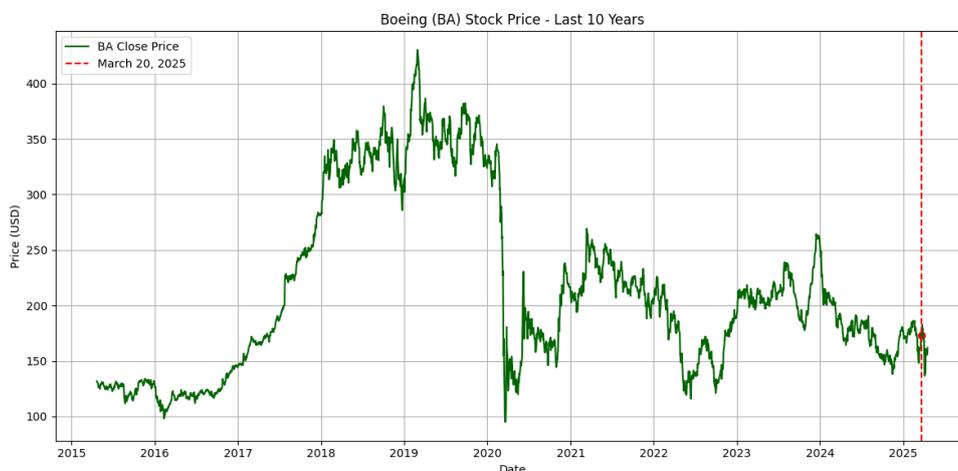
A notable example of this trend is the recent announcement by the U.S. Department of Defense, decision to award Boeing the development of the F-47, a sixth-generation fighter jet. The contract represents a strategic recovery for Boeing after years marked by scandals related to the 737 MAX model, the COVID-19 pandemic, and recent incidents that damaged its reputation and stock price.

***From an all-time high of 430 dollar per share in 2019, the company's stock plummeted by more than 70%, hitting lows around \$128.***

The F-47 contract whose official value has not yet been disclosed could exceed \$20 billion in its initial phase and over \$50 billion when including maintenance and logistical support throughout its operational lifespan. It is expected to become the largest aerospace contract in history.

***The aircraft will be manufactured at Boeing's facilities in St. Louis, Missouri, where the company has already invested \$1.8 billion in infrastructure upgrades.***

The announcement triggered a 5% increase in Boeing shares and a 6% drop in those of Lockheed Martin—the traditional supplier of the F-22 and F-35 models which, although excluded from the direct award, will likely participate as a subcontractor for specific components. This contract not only revitalizes Boeing's position in the defense sector but also signals a potential redefinition of its corporate strategy between commercial and military aviation.



At the same time, the U.S. continues to reinforce its air power through other major contracts. Lockheed Martin secured a \$7.8 billion amendment for the delivery of 126 additional F-35 units (Lot 17), while Raytheon Technologies signed a \$525 million deal with the U.S. Navy to produce ESSM Block 2 missiles, enhancing short- and medium-range air defense.

These developments demonstrate that defense contracts are not only responses to military needs, they also serve as engines for investment, skilled employment, and technological leadership, solidifying their strategic relevance in the global economic landscape.

## **Germany at the Center of Europe's Rearmament**

Europe is undergoing a phase of structural transformation driven by increased defense spending and the need to strengthen strategic autonomy. Germany is emerging as a central hub of this reconfiguration. For instance, a Volkswagen plant in Osnabrück will be repurposed by Rheinmetall, Germany's leading arms manufacturer, for military production. Civilian factories are being transformed into defense hubs to meet the growing demand for military systems—echoing past instances of industrial reconversion in times of geopolitical tension.

The debate over creating a unified European Army has gained momentum amid doubts over the long-term reliability of traditional allies. The initiative aims to boost the continent's defense capabilities and industrial sovereignty by consolidating budgets, standardizing systems, and reducing dependence on U.S. defense giants like Lockheed Martin and Raytheon.

***This new framework would benefit major European defense firms like Thales, Rheinmetall, BAE Systems, Leonardo, and Airbus Defence & Space, ensuring a steady stream of contracts and encouraging innovation.***

Strategic programs like FCAS (Future Combat Air System), the future European fighter jet, or MGCS (Main Ground Combat System), the new Franco-German tank, would gain traction under an integrated continental defense model. Furthermore, the European Defence Fund and joint procurement mechanisms offer financial stability and enhance the bloc's competitiveness. However, smaller firms relying on national contracts may face difficulties, and lack of political consensus could hinder progress.

Meanwhile, leading European defense companies are capitalizing on the favorable context. Thales reported a 26% increase in its order book during the first half of 2024, reaching €10.8 billion, driven by demand for advanced electrical systems and cybersecurity solutions. Rheinmetall secured major contracts to supply artillery shells to NATO and Ukraine, while BAE Systems raised its forecasts after new land and naval platform orders. Notably, Thales and the United Kingdom have agreed to modernize the Royal Navy's fleet with advanced anti-submarine systems, autonomous drones, and AI technologies.

Collectively, these developments point to a profound reconfiguration of the European industrial and military landscape.

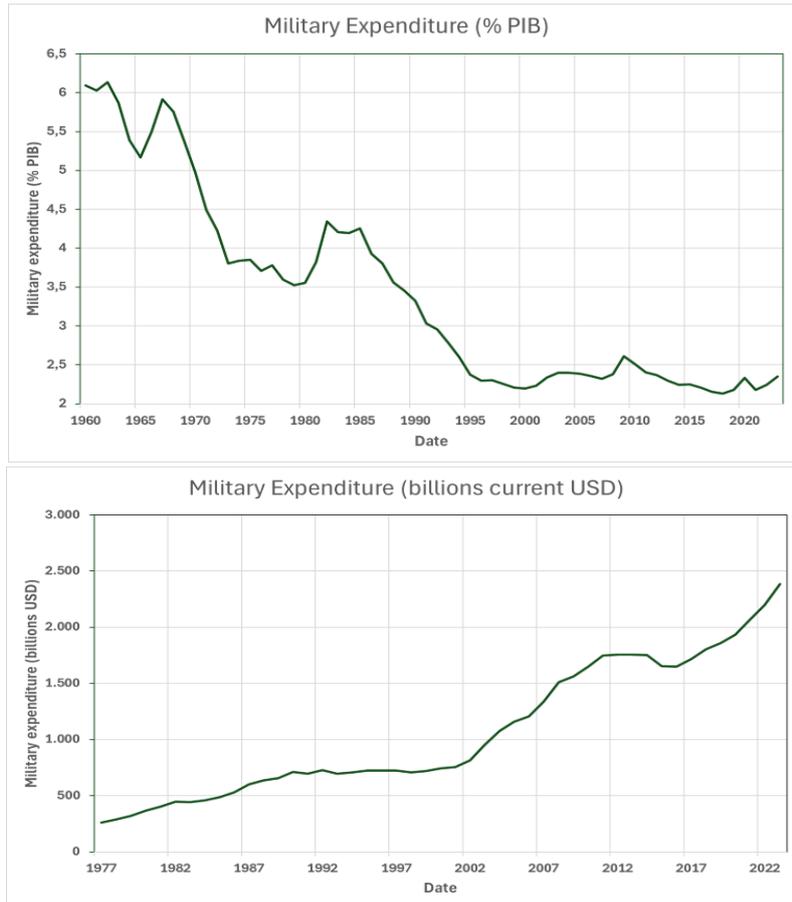
***Defense is becoming not only a strategic sector for the continent's security but also a key driver of investment, innovation, and employment.***

The combination of industrial conversion, military integration, and sustained contracting positions Europe at a unique juncture: the chance to consolidate a robust defense industry aligned with its geostrategic interests. Success, however, will depend on political will, coordination, and long-term vision across the continent.

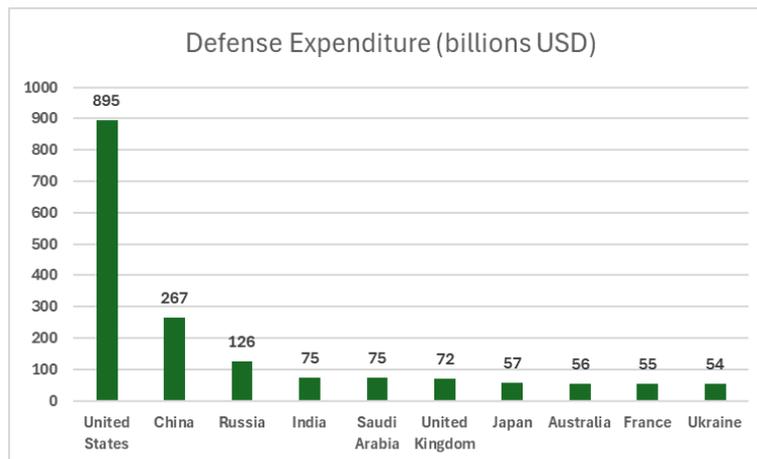
## **Financial Valuation of the Defense Sector**

### **Evolution of the industry up to the present**

The following charts illustrate the gradual decline in the relative prominence of military spending within global budgets. Although defense expenditures have continued to increase in absolute terms, their share of global GDP has steadily decreased—from levels exceeding 6% in the 1960s to approximately 2% by the early 21st century, where it has since remained relatively stable.



According to recent data from sources such as [globalfirepower.com](http://globalfirepower.com) and [escudodigital.com](http://escudodigital.com), the countries with the largest defense spending budgets by 2025 are:



These figures reflect the investment allocated by each country to its armed forces, including acquisitions, maintenance, and other related expenditures.

## Factors driving defense investment

Defense investment is shaped by a complex mix of geopolitical, technological, economic, and political factors. Rising international tensions—particularly in regions like Eastern Europe and the Indo-Pacific—have driven many countries to significantly increase their defense budgets,

aiming to bolster national security in the face of growing threats such as cyberwarfare, artificial intelligence, and autonomous weapons. At the same time, the modernization of armed forces has become a strategic priority, fueling long-term demand for advanced defense technologies. Alliances like NATO further reinforce this trend by requiring member states to allocate a minimum share of GDP to defense, often through collaborative projects and joint military initiatives. On the domestic front, political pressure, national pride, and the role of defense industries in job creation also sustain investment levels.

***However, the sector's future will also depend on how governments navigate periods of economic uncertainty, as fiscal constraints during downturns could impact defense spending.***

Additionally, evolving threat perceptions—ranging from terrorism and hybrid warfare to the proliferation of weapons of mass destruction—are compelling nations to adapt their strategies and allocate more resources to emerging domains such as cybersecurity and digital defense. Together, these drivers suggest that while the pace of growth may vary, investment in defense is likely to remain a global priority in the near to medium term.

## **Is the current rise in the sector sustainable or is it a temporary effect?**

The defense sector appears to possess structural characteristics that support the notion of sustained long-term growth. However, the current pace of expansion is largely driven by ongoing geopolitical tensions and policy decisions, which—although likely to persist in the short term—remain subject to the evolving global context.

***Given the recent surge in spending and the possibility of ceasefire agreements, it is plausible that this upward trend may decelerate in the near future.***

It is also essential to recognize the various risks that could hinder long-term sustainability, including shifts in the global economic landscape, changing political agendas, and a potential easing of international tensions. While sustained growth in the defense industry is certainly plausible, its trajectory will ultimately depend on unpredictable variables such as geopolitical developments, government policies, and the implementation of future international treaties.

As mentioned in the previous section, the impact of these trends will not be uniform across the sector. Different segments—based on the nature of military equipment and technology—will likely be affected in varying ways. Companies specializing in conventional armaments and platforms, such as firearms, aircraft, and armored vehicles, are expected to benefit from the current conflict-driven demand. However, their long-term prospects may be less favorable if disarmament initiatives and multilateral agreements gain momentum.

Conversely, firms focused on technological innovation and advanced defense systems—such as satellite infrastructure for secure communications or equipment outside the scope of existing arms control treaties—are more likely to experience steady and sustainable growth.

## **Rheinmetall Valuation**

Founded in 1889, Rheinmetall is a German company that has evolved from its origins as an arms manufacturer into one of Europe's leading defense and technology groups. After a period of diversification into civilian sectors post-World War II, including a strong footprint in the

automotive industry, the company refocused on defense during the 1990s amid renewed geopolitical tensions.

Rheinmetall's business model is structured around four main divisions. Vehicle Systems, focused on manufacturing combat and support vehicles, with a strong presence in Europe and international operations in the U.S., the UK, and Australia; Weapon and Ammunition, specializing in short- and long-range weaponry, explosives, and defense systems; Electronic Solutions, which develops advanced technologies for air defense, radar, and electronic systems for fighter aircraft; and Power Systems, dedicated to innovative solutions for the automotive, energy, and industrial sectors, with a focus on electromobility, digitalization, and hydrogen technologies.

Today, Rheinmetall stands as a key defense contractor for NATO and a core component of Europe's security and industrial base.

## Recent Performance

***In 2024, the company reported record revenues of €9.75 billion (+36% YoY) and an operating result of €1.48 billion, achieving a 15.2% EBIT margin.***

The company is also undergoing a strategic workforce expansion, aiming to reach 40,000 employees by 2028, up from 34,000.

***Rheinmetall's stock value has doubled in the past year, making it one of the top performers on the DAX 40.***

This strong growth is not only due to the rise in defense spending in Europe, driven by a potential escalation of the conflict in Ukraine, but also due to its strategy of both organic and inorganic growth. Since 2023, the company has strengthened its M&A strategy, forming key alliances. It established a joint venture with the Italian defense company Leonardo and has signed strategic agreements with defense giants such as Lockheed Martin in areas like air defense, missiles, and simulation, as well as with Northrop Grumman for the development of F-35 fighter jets. These moves have strengthened its position in key sectors, and the company expects capital expenditures to grow by around 9% in the short term and stabilize at around 5% in the coming years.

The company also maintains a solid financial management, with a net debt to EBITDA ratio, of 0.88. Another relevant aspect of Rheinmetall's strategy is its dividend policy.

***Since 2014, the company has consistently increased its dividends, going from €0.30 per share that year to €5.70 in 2023.***

## Comparable Company Analysis

To value Rheinmetall using multiples, the approach chosen was to compare the company with European firms, as they are its direct competitors and share similar operational characteristics and markets. The selected comparable companies are BAE Systems, Leonardo, Thales, and Saab, all of which have comparable business models and similar geographic exposure.

## EV/EBITDA Valuation

To value Rheinmetall using the EV/EBITDA multiple, the company's operating results have been projected for the fiscal years 2025 and 2026. For 2025, an EBITDA of €1.707 billion has been forecast. Once the projected EBITDA is established, the median EV/EBITDA multiple of the sector's comparable companies is calculated, which amounts to 19.80x. This multiple is applied to Rheinmetall's projected EBITDA, resulting in an estimated Enterprise Value (EV) of €33.8 billion.

To calculate the Equity Value, the EV is adjusted for the estimated net financial debt for 2025, which has been calculated by multiplying the Net Debt/EBITDA ratio (0.88x) by the projected EBITDA, resulting in net debt of €1.502 billion. Subtracting this figure from the Enterprise Value gives an Equity Value of €32.298 billion.

Finally, dividing this value by the number of shares outstanding (43.56 million) results in a target price per share of €741.46 for the year 2025. Compared to Rheinmetall's current share price (€1,464 as of April 19), this valuation implies a -49% difference from the market value, reflecting a clear divergence between the market's implicit expectations and the projected results.

## **P/E Valuation**

To value Rheinmetall using the P/E (Price to Earnings) multiple, the net profit expected for the 2025 fiscal year has been projected, using 2023 and 2024 figures as a reference and applying an annual growth rate of 8%, in line with the estimates communicated by the company during its Capital Markets Day.

Once the net profit for 2025 is estimated at €873 million, the median forward P/E multiple of the previously selected comparable companies has been used. In this case, the resulting P/E multiple is 25.75x. Applying this multiple to the 2025 net profit yields an Equity Value of €22.47 billion.

It is important to note that the P/E multiple already reflects equity value, as it relates directly to the company's net earnings attributable to shareholders. Therefore, no adjustment for net financial debt is required in this case.

Dividing the Equity Value by the number of shares outstanding (43.56 million) yields a target price per share of €516.3. Compared to Rheinmetall's current trading price (€1,464 as of April 19), this valuation implies a -64.7% difference, revealing a significant gap between the market price and the result of this valuation methodology.

## **What does the Market Value in Rheinmetall?**

The notable disparity between the target prices obtained through multiples and Rheinmetall's current share price can be attributed to several cyclical and structural factors that influence the market's perception of the company.

In particular, the valuation based on the P/E multiple yields a target price of €516.3 per share, representing a -64.7% difference compared to the current market price of €1,464. On the other hand, the valuation using the EV/EBITDA multiple estimates a target price of €741.46 per share, which is also below the market price, though with a more moderate difference of -49%.

These discrepancies can be mainly explained by the conservative approach used in the projections.

***The model considers an EBITDA growth of 15.5% and a net income growth of 8% annually, in line with the company's own forecasts for 2025.***

However, this scenario may be viewed as conservative given the current context, where defense spending in Europe has seen a historic increase, driven by the conflict in Ukraine, global geopolitical tensions, and rising concerns over national security.

In this regard, many European governments have announced rearmament and modernization plans for their military capabilities, spurred by the war in Ukraine and growing global tensions, such as the conflict between Israel and Hamas. Although these commitments have been made, their effects have not yet been fully reflected in the financial results of companies in the sector, leading investors to value companies like Rheinmetall based on future growth that has yet to materialize in their current fundamentals. In this context, it is likely that the market is pricing in a more optimistic scenario, with higher revenues and margins in the coming years, which would explain why the current share price incorporates more ambitious expectations than those reflected in a 2025 forward multiples-based valuation.

Additionally, although using the median of sector multiples is appropriate to avoid distortions from outliers, this methodology may not fully capture the premium that the market is willing to pay for companies with clear competitive advantages. In Rheinmetall's case, its strategic position within the European industrial sector, its diversified business model—with a significant presence in both military and civilian segments—and its access to large-scale, long-term public contracts make the company particularly attractive to investors, which could justify a valuation above the sector average.

Finally, it is important to consider the impact of market sentiment and speculation on the current share price. The dominant narrative of a bullish defense spending cycle, combined with the lack of comparable alternatives with similar growth and visibility profiles, may be influencing the stock's valuation, driving its price above what short-term fundamentals alone would justify. This emotional component, especially present in sectors sensitive to geopolitical changes, may help explain part of the gap between our valuations and the current market price.



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