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Defence Market Trends in the 21st Century and Opportunities for the European Defence Sector

INTRODUCTION

The essay deals with the current armament business and concludes on the basis of historical facts how Europe as an economically successful continent could again come to the fore in the defence sector.

The military news platform <https://www.defensenews.com/top-100> publishes a ranking of the 100 most successful defence companies every year. The ranking of the 100 most successful defence companies in 2021 includes 50 companies based in the USA, 7 companies in the People's Republic of China and the United Kingdom, 4 based in France and South Korea, 3 based in Japan and Israel, 2 companies each based in Russia, Spain, Germany, Turkey, Italy and India, and 1 company located in Ukraine, Canada, Australia, the Netherlands, the United Arab Emirates, Norway, Brazil and Singapore. A company is based in the Netherlands/France (Airbus SE) for corporate law and tax reasons. The ranking shows the subordinate role which the arms industry in European countries currently plays.

THE DEFENCE INDUSTRY WORLDWIDE - AN OVERVIEW

The world in the 21st century has become much more complex in terms of security policy than it was in the second half of the 20th century. In this new environment, the global political position of every continent has deteriorated dramatically.

The arms industries on the *American continent* [1] are dominated by the USA. The most important arms producers in the USA are Lockheed Martin, Northrop Grumman, Boeing and General Dynamics. In South America, Brazil, Chile and Argentina have notable arms factories.

The armament industries on the continent of *Africa* [1] are shaped by the armament industries of South Africa, Egypt and Algeria. In South Africa, the Denel produces air and land systems, Tellumat communications equipment, Paramount Group armoured combat vehicles and some



Figure 1. The armoured infantry fighting vehicle (AIFV) Ulan/Pizarro was developed by Austrian arms factorer Steyr and the Spanish arms factorer Santa Bárbara Sistema (Photo: Bundesheer / Markus Zinner)

shipyards produce combat ships. Egypt and Algeria are able to manufacture armament for the land forces. The arms industries of the rest of Africa are insignificant.

The arms industry in *Australia and Oceania* [1] only exists in Australia and New Zealand. The most efficient defence companies in Australia are BAE Systems Australia and Thales Australia as well as Boeing Australia. ASC Pty is a leader in warship construction. New Zealand has only a small defence industry.

Asia [1] is a large continent and it is dominated by some major powers as well as some smaller states with strong armed forces. Israel, Iran, Pakistan, India, Singapore, the People's Republic of China, Taiwan, South Korea, North Korea and Japan have an efficient arms industry. In the other countries, there exist only small capacities. The defence industry in Israel is dominated by Elbit Systems, Israel Aerospace Industries, IMI Systems and Rafael Advanced Defense Systems. Iran's major defence companies are Defense Industries Organization, Iran Electronics In-

ÖSSZEFOGLALÁS: A fegyverkereskedelem jövedelmező üzlet. A 21. század elején Európa országai már nem játszanak központi szerepet ebben az üzletben úgy, mint 100 évvel ezelőtt. Az Európai Unió legújabb törekvései abba az irányba mutatnak, hogy az Európai Unióban ismét nagyobb jelentőséget kapjon a hadászati termékek fejlesztése és gyártása.

KULCSSZAVAK: Fegyveripar, 100 legnagyobb fegyvergyártó, A fegyveripar története, Európai Védelmi Iparfejlesztési Program, Európai Védelmi Alap

ABSTRACT: The arms trade is good business. At the beginning of the 21st century, the countries of Europe no longer play the central role in this business as they did more than 100 years ago. The most recent efforts made by the European Union indicate that there is an intention to give more importance to the development and production of armament goods in Europe again.

KEY WORDS: Armament industry worldwide, 100 biggest arms producers, History of Armament Industry, European Defence Industrial Development Program, European Defence Fund

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dustries, Aerospace Industries Organization, Marine Industries Organization. In Pakistan, the Pakistan Ordnance Factories produce goods exclusively for the armed forces. Furthermore, the Pakistan Aeronautical Complex produces aircrafts and the Karachi Shipyard warships, and there are a number of electronic companies as well. The largest arms enterprise in India is the Ordnance Factory Board with around 41 companies producing for the land forces. Furthermore, there is the aircraft manufacturer Hindustan Aeronautics Limited and some powerful shipyards and electronic companies. For its size, Singapore is a state with a highly efficient arms industry. The former four Singapore Technology (ST) companies have been merged into one company (ST Engineering). The People's Republic of China has created an impressive arms industry over the last 20 years. Of the companies, the China North Industries Group (Norinco), the China South Industries Group, the China National Nuclear Corporation, the Aviation Industry Corporation and the two shipbuilding contractors, the China State Shipbuilding Corporation and China Shipbuilding Industry Corporation are particularly noteworthy, and excellent electronic engineering companies exist as well. The arms industry of Taiwan is highly specialized in the production of weapons systems that enable the country to counter the specific threat of an invasion from the mainland. On the Korean peninsula, North Korea produces in its largest complex Number 26 near the border to China weapons and Ryu Kyong-su tanks for the army. North Korea also produces aircraft and warships, especially small submarines and a new submarine which is armed with ballistic missiles with a nuclear warhead. South Korea has an arms industry which is part of such major industrial companies as Hyundai Motor Group, Hanwha Group or the former Daewoo Group (for example: Daewoo Shipbuilding & Marine Engineering), and it also produces aircraft at Korea Aerospace Industries. In Japan, the large industrial companies also produce armament goods, i.e. Mitsubishi Heavy Industries, Kawasaki Heavy Industries, Mitsubishi Electric, Japan Marine United, Toshiba, Komatsu, ShinMaywa Industries, Nippon Steel.

Finally, the arms industry in Europe [2], including Russia, will be presented. Today's European armament industry is diverse, but the vast majority of companies are small and medium-sized companies. In this essay, only the most important ones are presented. For more information, the author refers to his book on the European defence industry. Smaller countries are not considered at all for reasons of space. The flagship of the Belgian arms industry is Fabrique Nationale de Herstal. Another company is CMI, which has a long tradition and is closely associated with the name Cockerill, which has made a particular contribution to the industrialization of the country. The most important companies in the defence industry in Germany are Krauss-Maffei-Wegman, Rheinmetall AG, Airbus Group Defense and Space Division Airbus Defense, ThyssenKrupp, Lürsen, Heckler & Koch and Diehl. With Patria, Finland has an excellent arms company that works closely with the armed forces. Ammunition is produced by Nammo, which is an important ammunition manufacturer in the entire northern European region. The defence industry of France is dominated by the companies Nexter, Naval Group, Dassault Aviation, Safran Group, Airbus, Thales Group and MBDA. In Greece there exist the Hellenic Defense Vehicle Systems and Hellenic Aerospace Industry and Hellenic Shipyards. The most important companies in the defence industry of the United Kingdom are BAE Systems, Rolls-Royce, Smith Group, Babcock International Group, Britten-Normann,



Figure 2. The European arms industry is able to build aircraft carriers. Here in the picture the British HMS Queen Elisabeth II (Photo: Royal Navy)



Figure 3. The automatic rifle produced by Austrian weapons manufacturer Steyr Mannlicher also found its way into a James Bond film (Photo: Bundesheer / Günther Filzwieser)

Qinetiq, Insys, and Cobham. In Italy, Leonardo, Fincantieri, MBDA, Iveco produce armament goods. The armament industry in the Netherlands is rather small, but very successful in shipbuilding thanks to Damen Schelde Naval Shipbuilding. (Figure 2.)

The armament industry of Norway is dominated by the Kongsberg Gruppen. In Austria, General Dynamic Land System Steyr, which belong to the U.S.-based General Dynamic Group, Diamond Aircraft Industries, Schiebel, Kapsch Group, Steyr Arms (Figure 3.), Glock Ges (Figure 4.),

Rheinmetall MAN and Hirtenberger Defense Systems produce armament goods. In Poland, the Polska Grupa Zbrojeniowa, PZL-Swidnik SA, WB Electronics and the Damen Shipyard Group and in Romania, the Industria Aeronautică Română and ROMARM produce armament goods. Switzerland has a long tradition in producing weapons. Today, RUAG, MOWAG, SIG SAUER AG, Pilatus Aircraft and the Rheinmetall subsidiary Rheinmetall Air Defence AG (former Oerlikon) produce armament goods. In Serbia, the Zastava Arms and Prvi Partizan arms factory produce armament goods. Slovakia has only limited capacities, for example Delta Defense, ZTS-OTS, and Keramet produce armament goods. Today's Czech Republic has a long tradition of manufacturing armament goods. Nowadays, important are VOP Cz, Tatra, Ceska Zbrojovka, Mesit Group, Tesla, Sellier & Bellot. In Spain, the shipbuilding company Navantia, Indra Sistemas, Airbus Group Defense and Space Division, and General Dynamics European Land Systems Santa Bárbara are successful producers



Figure 4. The Austrian gun manufacturer Glock produces a pistol, millions around the world have been sold
(Photo: Bundesheer)

of armament goods (Figure 1.). Turkey has become a major weapons manufacturer over the past few decades. The dominant companies are Roketsan Roket Sanayii ve Ticaret, Makina ve Kimya Endüstrisi, Otokar, Turkish Aerospace Industries, ASELSAN and some shipyards. Ukraine and Belarus have inherited weapon factories from the former Soviet era, which only have a low output. Hungary's defence industrial base has declined in the years since the break-up of the Warsaw Pact, but it retains capabilities in small arms and ammunition, communications, CBRN protection technologies, wheeled vehicle construction, electronics and missile repair. With the Zrínyi Program, the defence industry will also be revitalized, i.e. one of the most modern military plants in the world is being built in Zalaegerszeg. The defence industry of Russia has recovered since the fall of the Soviet Union and is producing all weapons in the plants of United Shipbuilding Corporation, Russian Helicopters, United Aircraft Corporation, United Engine Corporation, Almaz-Antey, Kalashnikov Concern, and Ruselectronics.

DECLINE OF THE EUROPEAN ARMS INDUSTRY AND ATTEMPTS TO REVIVE IT

In the first decade of the 20th century, the European great powers the United Kingdom, France and Germany were superior to all other countries in the world in terms of military efficiency and the efficiency of their armament industries. A pure number game can impressively underpin this statement, as can be seen in Table 1. The efficiency of the European armed forces was based, among other things, on the high-performance military technology base, which was able to produce all of the weapon systems demanded by the armed forces.

After the Second World War, all European states were almost insolvent and sat on a war industry which, due to a lack of demand, had to be quickly converted to peace time production. This arms conversion led to a large-scale merger of formerly independent companies.

More than 100 years after the beginning of the First World War, the picture has changed significantly, as can be seen in Table 2. After the end of the Cold War at the end of the 1980ies, all European states soon recognized that a common defence of Europe was useful and even necessary, but a real defence union has not yet emerged that has common armed forces under a united command and standardized armament.

Defence research has played an important role in the prosperity of a country in the course of history, because on the one hand it has developed weapon systems that could ensure superiority over the enemy in the context of interstate wars, and on the other hand almost every weapon development has through its spin-offs (Research results of military goods research, which can also be used to produce civil goods) effects on the consumer goods industry. A list of all these spin-offs together is already filling the library; therefore, only a few examples from the recent past in the 20th century should be mentioned. Technical development has particularly shaped defence research in the aerospace industry, research in connection with the development of the atomic bomb, the development of powerful ship propulsion systems, motorization and, last but not least, the Internet, navigation systems and wireless telephony. All of this basic research was largely financed by the state, and the beneficiaries were the companies that manufactured the products and brought them to the world market. How impressive the success of these companies for the individual states were is shown by the examples of the large US defence companies and the providers of computer technology, such as Microsoft and Apple.

As already shown in Table 2, European states only spend half as much on their armed forces as the USA. Another serious disadvantage is the fragmentation of the defence industry. The USA, for example, uses 30 large weapon systems in its armed forces, but the European states 178. In detail, the USA only has one type of battle tank, while the European countries have 17 different ones. The situation is similar with the large marine systems: The USA operates four different systems, the European states 29. And the same applies to air combat systems: The USA uses six different fighter planes, the European states 20. (Figure 5.)

This glaring disproportion means that in the individual states of Europe, compared to the USA, small series are produced, which for the individual states in Europe are much more expensive to procure than those in the USA produced on a large scale for the Pentagon. In Europe as a whole, this inefficiency leads to additional expenditure of up to 100 billion euros annually. The reasons for this are that almost 80 percent of all purchases in the defence sector in Europe are still carried out at national level and efforts to establish a common European market for armament goods have so far obviously come to nothing [3].

Figure 5. The Eurofighter Typhoon fighter plane flies over the Prater-Stadium in Vienna on the occasion of Air Policing for an international conference in Vienna
(Photo: Bundesheer / Markus Zinner)



Table 1: Military expenditures in 1905 of selected countries [8]

Country	Military expenditures in mio. Österreichischen Kronen	Country	Military expenditures in mio. Österreichischen Kronen
Belgium	51	Austria-Hungary	434
Bulgaria	15	Portugal	54
Denmark	17	Romania	39
Germany	1311	Russia	1275
France	802	Sweden	92
Greece	25	Swiss	23
United Kingdom	1517	Serbia	19
Italy	388	Spain	183
Netherlands	89	Ottoman Empire	158
Norway	24	Sum (Europe)	6516
1 Österreichischen Krone (at 1900 prices) = 3 €		USA	1691
		World	8700

Table 2: Expected military expenditures in 2022 of selected countries [9]

Country	Military expenditures in bio. US\$	Country	Military expenditures in bio. US\$
Belgium	5	Portugal	3
Denmark	4.3	Romania	5.3
Germany	50	Russia	65
Finland	3.4	Sweden	8.6
France	55	Swiss	7.6
Greece	4.9	Slovakia	2.1
United Kingdom	61	Spain	16
Italy	30	Czech Republic	3.8
Ireland	1.1	Turkey	20
Croatia	0.8	Ukraine	6
Netherlands	14	Hungary	2.3
Estonia	0.7	Latvia	0.85
Norway	6.6	Albania	0.210
Austria	2.8	Montenegro	0.061
Bosnia-Hercegovina	0.16	North-Macedonia	0.17
Lithuania	1.2	Sum (Europe)	333
Poland	12	USA	780
Luxemburg	0.32	World	2.000
1 US\$ = 0.9 €			

Basic research is associated with a high risk or uncertainty with regard to the output, but basic research is indispensable for bringing about technological development and generating new ideas. Basic research can only work where a state or a community of states assumes the majority of the funding for it and where well-trained, innovative research capital is located. Basic research is traditionally carried out alongside applied and experimental research. In an international comparison, Europe is far less successful than the USA when it comes to basic research. On the one hand, this is due to the fact that the USA spends almost 2.8 percent of its gross domestic product on research and development and, on the other hand, in the USA, in addition to 150 research universities, there are a number of government agencies and private institutions such as foundations and funds with a basic research deal [4].

Furthermore, the US has a great potential of researchers, with around 8 researchers for every 1,000 employees. The importance of research in general in the USA is also reflected in the award of Nobel Prizes in the natural sciences, chemistry and physics. Since its foundation, 90 physicists and 67 chemists from the USA have been awarded this prize, compared to only 80 physicists from Europe, with the majority of the European award winners receiving the award before 1945 [5].

It would go far beyond the scope of the article to illustrate the superiority of the USA in the research field of basic research in the defence sector, therefore only a few key figures, which are openly accessible, are mentioned: According to a report in the *Proceedings of the IEEE* from February 2016, funded by the Department of Defense, the basic research of some 1,000 postdocs, 5,000 graduate

students and 5,000 undergraduate students and the DARPA (Defense Advanced Research Projects Agency with around 240 employees), which is one of several such research institutions, has an annual budget of around 3 billion US dollars, a sum that is higher than the Austrian defence budget of around 2.8 billion.

The joint development of capabilities for the armed forces of the member states has always been a concern of the EU bodies, but it was not until 2004 that the European Defence Agency (EDA) was founded, which is the central institution of the common security and defence policy of the EU. In 2007, the Treaty of Lisbon incorporated the EDA into European primary law. Since then, the EDA has been promoting operational needs and meeting needs. It contributes significantly to strengthening the industrial and technological base of the defence sector. The EDA can point to some positive results of its work since it was founded, but it has not yet succeeded in making a big hit due to low staffing and financial resources. It was therefore only a logical conclusion that those responsible in the EU have reconsidered their duties and, with the European Defence Action Plan and the European Defence Fund, have launched instruments that go far beyond the competencies of the EDA and give hope for a new impetus towards the improved defence capabilities of Europe.

In 2013, the European Council recognized the need for the states of the European Union to create a more innovative and competitive European Defence Technological and Industrial Base (EDTIB). Three years after this commitment, further fundamentals followed in 2016 with the EU Global Strategy and the European Defence Action Plan (EDAP) of the European Commission, which emphasized the importance of defence research. One of the core elements of the EDAP is the European Defence Fund (EDF), which proposes specific measures on how defence research should be more targeted in the future. The heart of the EDF is a research window and a skills window, which is derived from the concept of Permanent Structured Cooperation in Defence (PESCO), which is intended to enable the seamless transfer of research results into the development of new products. With this mechanism, EU funding is earmarked for defence research for the first time on the one hand, and for better cooperation between the member states and businesses in the development and procurement of defence-related technologies on the other.

The financial endowment of this fund provides that around 13 billion euros will flow into the fund between 2021 and 2027, of which 4.1 billion euros are provided from the EU budget and 8.9 billion euros as co-financing from the member states [6].

In order for the national interests to be pushed into the background, access to the money pot is tied to certain conditions. The EU money is only used to fund projects in which at least three participants, preferably small and medium-sized enterprises, so-called SMEs, from three different member countries take part and which are at the top of the priority list of the required skills and in particular the acceleration of the PESCO process are conducive.

In addition, around five percent of the total amount of the fund is earmarked for so-called high-risk research projects. In addition, only those projects are funded which, when they are developed up to series production, actually want to be purchased by the member states [7].

The next few years will show whether the large member states in the EU with a still functioning armament industry are willing to cooperate with other competitors on the armaments market and share the results of EU-funded re-

search, or whether they are not willing to do so out of pure self-interest. It would definitely be an advantage for the European armed forces if, as a result of the EDAP, cheaper standardized weapon systems were on the market and the states of Europe could thus afford more weapon systems with the available defence budgets.

With this financial endowment of the fund, the EU becomes the fourth largest investor in defence research in Europe and with this mechanism, for the first time in the EU, the entire area from research to development to procurement is funded on the one hand by substantial budget funds, and on the other by provision various financial instruments of the European Commission. With the development of the framework, it is now up to the individual member states to set up their own defence research program.

Recent events in Europe since the 2015 migration crisis have brought border management and the defence of Europe back to the fore. The initiatives to bring about a noticeably higher efficiency of the armed forces of the member states of the EU have been put back up on the agenda. In order to narrow the gap in capabilities between the armed forces of the USA and the member states of the EU, a European Defence Action Plan with a European Defence Fund has been launched. It will now be up to the individual member states whether this plan is actually implemented in practice and whether the fund is addressed by all member states.

As a connoisseur of the processes in the European decision-making bodies and as a connoisseur of the previous cooperation between the individual member states in the field of defence, the author appears to have a motto that comes from the great German poet Johann Wolfgang von Goethe: "I hear the message well, but I have little faith." On the other hand, things are not exactly the best for Europe, so that the quote can be contrasted with a saying by another great European, namely Cicero: "Dum spiro spero (as long as I breathe, I hope)!" And Europe is reflecting on its former strength and size and is again attaching more importance to the armed forces and its armaments technology base than it currently appears.

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