

Positions and prospects of Russian shipbuilding in the world market of naval equipment

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Abstract.

Research background: The products of the arms and military equipment market create the material basis for the country's military security. The most important segment of this market is the market of naval equipment. The acquired competencies have naturally led Russia to the role of the most important exporter in this market. The authors have repeatedly addressed the topic of Russian shipbuilding and the role of Russia in the world market of naval equipment and military ships.

Purpose of the article: The main goal of the research is to analyze the current state of the market of naval equipment, the positions of its main participants and, especially, Russia. To determine the future prospects of Russia's presence in this market, it was necessary to identify the main problems of Russian shipbuilding and consider the impact of external factors on the state of the industry.

Methods: Generalizations of the research are based on processing and systematization of data obtained from available information sources. Analyzing the statistics, the authors were able to deduce the trends of the current moment and determine the prospects.

Findings & Value added: The analysis of key market indicators, as well as the problems of Russian shipbuilding, allowed the authors to build possible scenarios for its future development, from optimistic under favorable external factors to pessimistic, in which the loss of not only military security, but also the position of the largest exporter in the world market of naval equipment and military ships is inevitable.

Keywords: *military shipbuilding; the market of naval equipment; submarine; surface warship; amphibious ship*

JEL Classification: *F14; L64; O57*

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1 Introduction

To ensure national security governments are forced to spend a significant proportion of their GDP on military expenditures. A large number of countries do not have their own arms industry (or at least are unable to produce a full range of military equipment) and therefore have to import military goods from abroad [1]. A relatively small number of countries, mostly large and developed one which have been producing arms for years, not only provide for their military industrial complex but also export a significant share of defense products to the global market. Besides, arms sales allow them to lower the cost of their own production and reimburse a part of defense-related expenses [2-3].

Another important factor (besides economic benefits) is that arms export allows to accomplish political goals, support military alliances, promote certain regimes in different regions [4].

The authors of this article, to varying degrees, but for a long time, have been interested in the problem of military production in Russia and its export of weapons and military equipment, including naval equipment [5-11].

Historically, since the time of Peter the Great Russia has been one of the major naval powers. Back in the twentieth century, during the Soviet period, Russia was well-known for its robust civilian and military shipbuilding. Today Russia is no longer a leader of civilian shipbuilding. But it continues to hold a leadership role in naval construction [8, 11].

Today Russian shipbuilding industry produces mostly military vessels. According to SIPRI statistics (arms industry data), JSC United Shipbuilding Corporation (USC) is ranked among 100 largest military companies in the world in 2017. Military sales account for 89% of its revenue [12].

Russia is the biggest country in the world with far stretching land and maritime borders. The development of shipbuilding industry has always been of utmost importance to the country. In these circumstances, the fleet needs to be deployed in different regions, which are characterized by diverse geographical and climatic conditions. That is why, Russia has a large fleet and is forced to constantly strengthen and modernize it.

To compare Russia's sea forces with other naval powers, China and the USA, we will look at the data provided by *globalfirepower.com*. According to it, China is ranked the first in terms of naval equipment (777 units). Then it is followed by Russia with 603 different types of naval equipment, and the USA with 490 items [13]. However, given Russia's territory and border length, the number of equipment units could have been higher.

The main goal of the research is to analyse the current state of the market of naval equipment, the positions of its main participants and, especially, Russia. To determine the future prospects of Russia's presence in this market, it was necessary to identify the main problems of Russian shipbuilding and consider the impact of external factors on the state of the industry.

2 Methodology, databases and analytical sources of research

The complexity of arms market research stems from the fact that world's research institutes, which deal with arms trade, have different methods of data analysis. To assess value flows of arms and military equipment (AME), data on prices is required. However, it is not always available. The use of different calculation and pricing methods leads to a huge discrepancy between the figures.

Stockholm International Peace Research Institute (SIPRI) is widely regarded as one of the most authoritative sources. The statistics, which institute provides, is widely used by many researchers. It is an exclusively open source, but has its own unique assessment methods [14-15].

According to its methodology, SIPRI assesses the similar types of weapons by using the so called "trend-indicator value" and charges the same price for the same goods, regardless

of their origins. On the one hand, it results in the imprecise evaluation of financial flows of different countries. On the other hand, such methodology shows arms transfer dynamics with a high degree of objectivity.

The International Institute for Strategic Studies (IISS) is another reputable agency, which annually publishes a bulletin “The annual assessment of military capabilities and defence economics of 171 countries worldwide”. Unlike SIPRI statistics, only a part of IISS' published data is available to the public [16-17].

There are several research institutes in Russia, including The Centre for Analysis of World Arms Trade (CAWAT). CAWAT offers its own statistics which is based on the contract's prices measured in dollars at the time of entering into the transaction.

It also allows to investigate the volumes of supplies to the market. To do it, one can use statistics provided by the UN Register of Conventional Arms. The UN register was established in 1991 and has served as an instrument of arms transfer transparency. Since 1993, Russia has annually provided information on arms export/import. However, this method of market analysis has a major weakness. Although each country should voluntarily submit data to the Register, not all countries do that.

In this paper statistical methods and system analysis method are used as analysis tools.

3 Results

Naval equipment is one of the most widely distributed and most traded military commodities in the world. This defense equipment is especially important for the countries with long maritime borders.

By using SIPRI and CAWAT statistics, it is possible to evaluate military and naval equipment market conditions. The diagram based on SIPRI data shows the changes in arms market after the end of Cold War to the present days (fig1.).

Initially (after the end of Cold War) arms market worldwide had been shrinking for the next decade. For the last two decades, however, it has been growing, regardless of global economic crises.

As SIPRI evaluates different types of arms with the use of trend-indicator values (TIVs), which do not show the actual price of military equipment items, one cannot fully rely on SIPRI's monetary estimates of the global arms market. However, its unorthodox method allows to observe the trends.

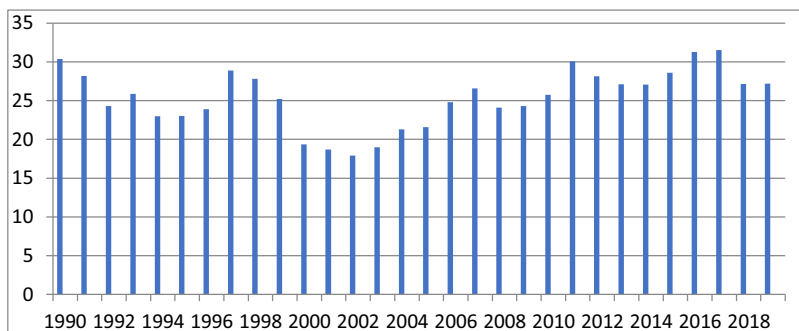


Fig. 1. World exports / imports according to SIPRI data for the last 30 years in billions of dollars at constant 2019 prices [18].

In our opinion, CAWAT data are more suitable for the evaluation of value flows. However, these data do not consider the inflation, because they are given in current prices at the time of entering into the transaction (Tab.1).

Tab. 1. World export / import for the last 8 years according to CAWAT in billions of dollars

2011	2012	2013	2014	2015	2016	2017	2018
59.1	58.2	55.6	67.6	74.3	81.2	86.6	84.8

Source: Yearbook of CAWAT 2019 [19]

Despite a huge discrepancy in figures due to the use of different methodology, the data provided by both institutes show that global military equipment market was growing from 2013 to 2017, and shrank slightly in 2018. However, the market volume remained consistently strong and could be compared to its volume during the end of Cold War. Overall, for the past 20 years, despite some fluctuations over the years, the upward trend is apparent.

When analyzing naval equipment market, it is important to choose an appropriate period to determine the volume share of each market participant (exporting and importing countries), positions of top sellers and "top buyers", market segmentation based on the main traded products.

Firstly, we will conduct our analysis using CAWAT data for an 8-year period, then we will use statistics provided by SIPRI for a period of 30 years. On the one hand, a short period may not fully show all capacities of exporters because it may take a lot of time to develop and produce the products. On the other hand, very long period may be rather misleading, because during this time a country may change its policy of arms sales. For example, it may switch from import to export like China did, or substantially decrease export like the USA.

First of all, we will find out what share of world arms sales the naval equipment accounts for. When one carries out the market analysis using statistical data provided by different agencies, it is necessary to know which products are being evaluated. CAWAT focuses on 8 major types of naval equipment: surface combatants (CSS), submarines (S), and boats (SV). SIPRI also evaluates the supply of warships of different types, but it does not group them into separate categories.

The segmentation of market based on main traded naval equipment such as submarines, surface combatants and boats can be presented on the basis of CAWAT data for an 8-year period (fig.2).

For the period from 2011 to 2018 all participants in the naval equipment market exported military production worth \$ 71,601.7 million. The share of surface combatants accounted for \$ 35,824.0 million, (50.03% of total sales), boats and small landings crafts — \$20,205.8 million (28.22%), and submarines — \$15,571.9 million (21.75%).

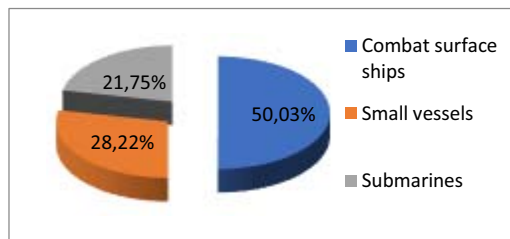


Fig. 2. Structure of world exports of naval equipment for 2011-2018% (calculated by the authors according to CAWAT data) [19]

The structure of exports of naval equipment by the world's leading exporters is presented in Table 2.

According to the data on cost estimates of naval military equipment presented in the table, it is evident which countries are the mains suppliers of different types of naval equipment. They are Russia, France, and Germany. Only these countries produce and sell all types of military ships. Other exporters are far behind.

Tab.2 Valuation of deliver to the world market of all categories of naval equipment for the period 2011-2018 by major exporters according to CAWAT data (million US dollars)

Country	Non-nuclear submarines	Combat surface ships	Small craft and minor landing vessels	Bcero
Russia	7187.0	4835.0	2345.0	14367.0
Germany	6150.2	2480.0	1603.1	10233.3
France	922.7	6238.4	1572.2	8733.3
Australia	-	2865.9	1749.2	4615.1
USA	35.3	2556.0	840.0	3431.3
China	200.0	1646.9	1380.6	3227.5
South Korea	808.3	1161.8	185.2	2155.3
Sweden	143.4	-	352.1	495.5

Source: calculated by the authors according to CAWAT data, [19]

All exporters can be divided into groups according to their market ranking and a type of naval equipment production (tab.3).

Tab.3 The share of naval equipment (NE) in the amount of military spending and the total weapons exports from major exporters for the period 2011-2018 (according to CAWAT data)

Country	Military expenditures, billions of dollars	Exports of AME, billions of dollars	Exports of all types of NE, billions of dollars	Share of NE in total exports AME, in%	Export of NE to the value of military expenditures, in%
USA	5401	225.2	3.431	1.5	0.06
RF	404.4	98.9	14.367	14.5	3.55
France	392.1	48.7	8.733	17.9	2.22
Germany	363.1	27.2	10.233	37.6	2.81
China	1052.1	18.5	3.227	17.4	0.31
South Korea	264.7	6.0	2.155	35.9	0.8
Australia	217.5	5.0	4.615	92.3	2.1
Sweden	48.0	8.8	0.495	5.6	1.03

Source: calculated by the authors according to CAWAT data, [19]

In the hierarchy of exporters the USA and Russia are at the top. Due to the Cold War, heavy investments in military production, naval power status and other factors, these two countries have become the largest developers and producers of naval equipment today.

At the same, it is noteworthy that the USA is reluctant to sell its newly developed products. They provide for their own arm forces, and export only a small share of military goods. According to CAWAT, for the period from 2011 to 2018 (8 years) US military expenditures accounted for \$5401 billion. The actual volume of all military goods export was \$ 225.2 billion of the total expenditures, which is 4.2%. The same indicators for shipbuilding products accounted for 0.06%.

Russia's military expenditures for the same period accounted for \$ 404.4 billion. The actual volume of all military goods export accounted for to 24.5% (\$ 98.9 billion) and 3.55% of shipbuilding products.

It is evident that each country has its own approach to military production exports. In fact, the USA is not the major exporter on the arms market.

Developed European countries such as Germany, France, and the Netherlands are considered to be the major exporters. These countries' manufacturers are highly competent in military equipment production, but they have never had such a huge military goods market as the USA or Russia.

France's military expenditures for the period from 2011 to 2018 accounted for \$ 392.1 billion. The actual volume of all military goods export was 12.4% (\$ 48.7 billion), while shipbuilding products accounted for 2.22%.

Germany's military expenditures for the period from 2011 to 2018 accounted for \$ 363.1 billion. The actual volume of all military goods export was 7.5 % (\$ 27.2 billion) while shipbuilding products accounted for 2.81%.

China is a unique case. It used to be the largest importer of military equipment, but now it has become export-oriented. With this said, the share of exports volume for the period from 2011 to 2018 (\$18.5 billion) of all military expenditures (\$1052.1 billion) accounts for only 1.75 %, while shipbuilding products account for 0.31% [20].

Another group of exporters includes the countries which can produce and sell only certain types of military equipment.

For instance, for the period from 2011 to 2018, Australia was ranked the 4th among major exporters of surface combatants after Spain, France, and Russia. It was ranked the third major among landing crafts suppliers after the Netherlands and Russia. Despite that, Australia has become one of the largest importers of surface combatants during the same period. Still, it does not export submarines to the market.

In fact, only a few countries export submarines. Sweden and South Korea are among them. However, their volume of deliveries is relatively small compared to the market leaders. Yet, these countries are forced to import certain types of naval equipment. Chile, for instance, exports only a small number of submarines (125 million dollars for the period 2011-2018).

According to the table 3, Australia specializes in naval equipment sales. During the given period, the country exported primarily naval equipment. For Germany and South Korea naval equipment sales accounted for a third of their total volume of export. France and China were less engaged in the sales of naval equipment. Compared to the total volume of export, the USA exports a relatively small number of naval equipment (only 1.5%).

It shows that the USA not only spends huge sums of money to ensure its national security, but it also helps provide security in other countries and still benefit from it. China and the USA enjoy a strong presence on the market only due to their high military expenditures. Yet, their military exports constitute a small percentage of all defense expenditures. It is evident that a major part of produced military goods goes to national defense needs.

As we have already noted, research institutes often use different methods of cost calculations. However, despite statistics show different figures, they reveal similar trends. Thus, when we addressed SIPRI data to analyze naval equipment market conditions for the same period from 2011 to 2018, the figures we received differed significantly from that of CAWAT. But the trends were the same. Using SIPRI data, the authors did not calculate the share of naval equipment to military expenditures because of the unusual methods that the institute uses to calculate the cost of equipment. The share of naval equipment in the total export (if both measures are presented in TIVs) shows which type/types of shipbuilding products is/are produced by a country.

Tab. 4. The share of NE in the total volume of AME exports by the main exporters for the period 2011-2018 (according to SIPRI data)

Country	Exports of AME, USD million	Exports of all types of NE, USD million	Share of NE in total exports AME, in%
USA	77459	1691	2.18
RF	55856	15738	28.15
France	14011	3143	22.45
China	12781	2704	21.12
Germany	11965	4858	40.48
South Korea	3470	1695	48.8
Australia	696	393	56.5

Sweden	2573	370	14.40
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Source: calculated by the authors according to SIPRI Arms Transfers Databases [18]

The table 4 shows that Germany, France, and Russia have the highest cost estimates of shipbuilding products. There is a strong presence of manufactures from China, South Korea, and the USA. At the same time, naval equipment accounts for a half of South Korean and Australian export.

When it comes to military products that require extensive efforts, it appears that the analyses of a longer time period will prove to be more reliable. CAWAT does not give such detailed information as SIPRI because the agency was established only in 2010. That is why we will use the data collected by SIPRI for the past 30 years, after the end of the Cold War and global arms market formation (tab. 5).

Over the period of 30 years, one can clearly see the largest exporters in shipbuilding industry. Germany, South Korea, and Australia are among them. Naval equipment accounts for almost a quarter of Sweden's and China's export.

Russia's volume of warfare ships export accounts for 10.8% of the total military equipment export volume. It means that Russia's export throughout the whole period fully corresponded to global market needs.

Tab. 5. The share of NE in the total volume of AME exports by the main exporters for the period 1990-2019 (according to SIPRI data)

Country	Exports of AME, USD million	Exports of all types of NE, USD million	Share of NE in total exports AME, in %
USA	289310	13480	4.66
RF	145717	15738	10.80
Germany	53071	25675	48.38
France	52926	11392	21.52
China	29777	7053	23.69
Sweden	9903	2453	24.77
South Korea	6001	2981	49.68
Australia	1666	936	56.18

Source: calculated by the authors according to SIPRI Arms Transfers Databases [18]

Markets for different categories of weapons differ greatly in the degree of restriction of competition, since each segment has a different number of suppliers.

For instance, in submarine market their number doesn't exceed 10, in surface combatants' market there are around 30 of them, and a large number of manufacturers produce boats and landing crafts. A small number of suppliers in submarine market is explained by the fact that only a few countries in the world have sufficient technological, scientific, and industrial capacities to develop and construct submarines. Among the products that also require a lot of efforts are surface combatants, but much more countries are involved in their export. Landing craft and boats are the least complex and highly popular products in naval equipment market.

The distribution of sales across the market for the period from 1990 to 2019 (data collected by SIPRI) is shown in the table.6.

Tab. 6. Shares of the main exporting countries in the world market of naval equipment for the period 1990-2019 (according to SIPRI data)

Country	The value of the export of NE, in million dollars	Share in the world market of export of NE for the period, in %
Total	111392	100
USA	13480	12.10
China	7053	6.33

RF	15738	14.13
France	11392	10.27
Germany	25675	23.05
South Korea	2981	2.68
Australia	936	0.84
Sweden	2453	2.20
others		28.4

Source: calculated by the authors according to SIPRI Arms Transfers Databases [18]

To sum up, we took the data from different research institutes (for a short period of 8 years, and for a long period of 30 years) and identified the major exporters of military equipment. Their number is lower than the number of importing countries.

Taking into account that for the period from 2011 to 2018 military equipment import accounted for \$71601.7 million, we constructed the diagram of actual import distribution by importing countries (fig. 3).

The largest importer of the recent decade is India. However, rapidly growing economy, leadership claims, rivalry with China force India to focus on its own military production. Therefore, India has become an exporter of certain types of arms. For instance, it produces and exports landing crafts. According to SIPRI, for the period from 1990 to 2019 India's export volume accounted for \$549 million, with \$328 million (or 60%) from export of shipbuilding products [21].

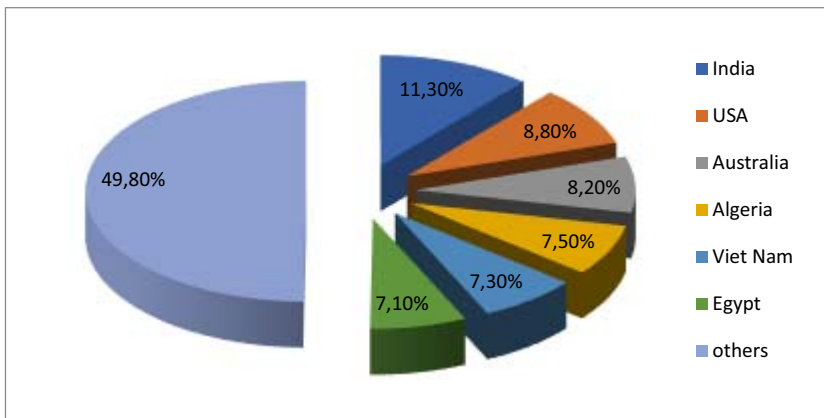


Fig. 3. Distribution by importing countries of the actual import of naval equipment for 2011-2018 (calculated by the authors according to CAWAT data [19])

It should also be noted that relationship between the partners of arms market are pretty stable. The reasons for this are a long-term use of military equipment, the need for a long-term maintenance, frequent modernization of previously delivered weapons. All this establishes strong long-term ties between exporting and importing countries.

During the second half of XX century until the beginning of XXI century, China and India were Russia's key partners. Russia still exports its naval equipment to these countries [9-10]. The particular feature of this partnership is that importing countries do not buy end products, but purchase manufacturing license. Given China's success in developing its own arms industry, the countries could soon become independent from Russia's import and turn into serious competitors in the global market. The entry of new exporters significantly increases competition and can reduce the share of current leaders. This issue will affect all participants. Besides, Russia also faces a couple of internal difficulties.

For the past two decades, in addition to India and China, Russia has also been exporting its naval equipment to Vietnam, Algeria, Egypt, Kazakhstan, Turkmenistan, Slovenia, and

South Korea. According to SIPRI, this importing country have purchased all types of Russian warships for the past 20 years.

Although Russia dominates global naval equipment market, the stability of its leadership largely depends on the resolution of shipbuilding industry problems.

The government adopted "The Strategy for the Development of the Shipbuilding Industry up to 2035" and the "Shipbuilding program up to 2050". These documents define the main directions of state policy in shipbuilding sphere.

The main common problems of the entire industry include the following:

- One of the main problems of this industry are high debt-to-income ratio of shipbuilding industry companies, which leads to high credit risk [22]. Because of the long production cycle and credit at high interest rates, debt ratio amounted to 4 in the industrial sector and to 1.5 in a science sector. For a normal business activity debt ratio must not exceed 2.
- Staffing problem is related to the lack of highly-skilled workers and aging of the workforce. Despite the growth of average monthly salary, the substantial differences in the social and economic development of the regions result in capital outflows to the regions with more favorable economic conditions.
- The structure and lifespan of the key funds in the sector lead to the loss of production competitiveness due to its cost.
- Insufficient workload of development and producer organizations impedes modernization and production of goods that would be competitive on the international level.

Some problems are not easily solved as they are caused by external factors such as global energy prices. National currency fluctuation and existing levels of inflation lead to cost estimation uncertainty and price setting issues [23].

According to "Strategy", there are three possible case scenarios for the shipbuilding industry. The development of this industrial sector depends on the state of the overall economy and state support.

A pessimistic or conservative scenario will unfold in case of economic slowdown, which will be caused by the fall in oil prices, high inflation, high dollar rate, low level of government funding. All that will have a negative impact on the industry as a whole.

Innovative scenario assumes a stable development of the industry along with sustainable development of Russian economy and minimal state participation.

Target scenario or the optimistic scenario will come about in case of accelerated economic growth, effective state regulation. That will lead to the growth and development of shipbuilding industry as a whole, growth of production export and high competitiveness [24].

4. Conclusions

This analytical review of the modern state of global naval equipment market led us to the following conclusions.

1. Considering Russia's geographical location, its long maritime borders and historical background, we may conclude that global naval equipment market was and still is the most important segment of global arms market. Its share accounts for 10-12%.
2. The analysis of naval equipment market dynamics for an 8 and 30-year period gives high hopes for the future development of this market. Data provided by different research institutes do differ (as they use different calculation methods), but the main trends in this market development are clearly observed.
3. For the last 3 decades Russia, France and Germany have been world's major exporters of naval equipment. It is noteworthy that all these countries produce all possible types of naval

equipment (along with the USA, but because of its unique policy regarding sales, including naval equipment sales, its products are underrepresented in naval equipment market).

4. There is a tendency to increase competitiveness in the naval equipment market, because such countries as China, India and South Korea are emerging as new exporter.

5. Russia secures the place among three largest exporters of naval equipment (both in the naval equipment market and across its different segments). Will Russia be able to secure its place in the naval equipment market short or mid-term? The answer depends on the successful resolution of the serious problems (internal and external) which the industry currently faces. What scenario will unfold? It depends on many factors, including those that Russia has no control of. However, the internal problems must be solved first. If the government does not provide enough support to this industrial sector, the pessimistic scenario will be the most plausible outcome.

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