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# DETERMINANTS OF THE ARMAMENT INDUSTRY STRATEGY IN THE TIME OF WAR AND UNREST

**ABSTRACT:** The geopolitical situation after February 24, 2022 changed rapidly. The issues of globalization and industrial linkages have taken on new importance. Cooperation in supply chains is no longer based solely on cost minimization. The economic aspect was relegated to the background in favor of the availability of raw materials and goods. Against this background, the arms industry is taking on a new dimension and its effectiveness, operational efficiency and innovation become the conditions for maintaining a sense of security within NATO and the European Union. The aim of this article is an attempt to identify the determinants of the armaments industry strategy of the times of war and unrest. The speed of action becomes a determinant of the armaments industry functioning. It is necessary to cooperate with enterprises that were not active in the processes of arms production so far.

**KEYWORDS**: defense (arms) industry, security, war

## INTRODUCTION

After the fall of communism, Francis Fukuyama announced that it was not only the end of the Cold War but the end of history as such. He meant the end of the ideological evolution of humanity and the spread of liberal democracy as the ultimate form of government. The author of "The End of History" argued that there is no longer any serious ideological alternative to the

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political, social and economic model of life adopted by the Western world[1]. Francis Fukuyama's thesis about the "end of history" that would come after the collapse of communism was opposed by political scientist Samuel P. Huntington in his 1993 article The Clash of Civilizations?[2]. S. P. Huntington stated in it that politics will be dominated by clashes between civilizations in the future. Cultural differences stemming from religious divisions will become the sources of international conflicts. History has shown that S. P. Huntington was right. Religious tensions in particular have increased in the last 20 years. The world of Western values has come into conflict with the world of Islam. Al-Qaida, through the attacks on September 11, 2001, provoked military actions that brought down the regime of Saddam Hussein in Iraq and the Taliban in Afghanistan. As a result, there was an increase in unrest in those parts of the world and the global activity of radical Islamic terrorists. The Western world, however, persisted in the belief that liberal democracy is an ideology that can be effectively implemented anywhere. Attempts to implement it after the wave of collapses of regimes in Libya, Tunisia and Egypt in 2014 showed in practice the unreality of such a belief.

Russia's attack on Ukraine on February 24, 2022 made the public opinion stop believing in the illusions that Russia is an almost civilized country, which, like a sleepy bear, will sometimes roar or bite but in general is tamed and will not do much harm. Voices admonishing Russophobias and good advice about doing business, with no connection to politics, fell silent. Words by the Polish President Lech Kaczyński in Tbilisi in 2008, about the fact that after Georgia, the time will come for Ukraine and then maybe for Poland, took on a completely new meaning[3].

In the countries of the democratic world, it was understood that Russia is an evil empire that represents a civilization that is in opposition to the values of the democratic Western countries. The President of Russia, Vladimir Putin, is supported by Patriarch Kirill, who uses the Orthodox Church as traditionally supported by power, an example of which was his response to the appeal of the World Council of Churches which called on him to contribute to an end to Russian aggression against Ukraine. Kirill supported the aggression saying, among other things: "As you know, this conflict did not start today. I am deeply convinced that its initiators are not the peoples of Russia and Ukraine which come from the same Kiev baptismal font, they share

[1] L. Freedman, *Przyszła wojna,* Wyd. Bellona, Warszawa, 2019, p. 186 - 187
[2] S.P. Huntington, *Zderzenie cywilizacji i nowy kształt ładu światowego*, Wydawnictwo Zysk, Poznań, 2018, p. 7
[3] A. Nowak, *Polska i Rosja, Sąsiedztwo wolności i despotyzmu X-XXI w.*, Wyd. Biały Kruk, Kraków 2022, p. 15.

a common faith, common saints and prayers, and common historical fates. The genesis of the confrontation lies in the relations between the West and Russia”[4].

The geopolitical situation changed rapidly. The issues of globalization and industrial linkages have taken on new importance. Cooperation in supply chains is no longer based only on cost minimization. The economic aspect was relegated to the background in favor of the availability of raw materials and goods. Against this background, the arms industry is taking on a new dimension, the effectiveness of which, operational efficiency and innovation become the conditions for maintaining a sense of security within NATO and the European Union.

Peter Bloom, professor of management at the University of Essex, wrote in The Conversation: “The conflict has already witnessed a huge increase in defense spending. The European Union has announced that it will purchase and provide Ukraine with weapons worth 450 million euros, while the US has pledged 350 million dollars in military aid (in addition to over 90 tons of military supplies and 650 million dollars in 2021 only (...) Raytheon produces Stinger missiles, and jointly with Lockheed Martin, Javelin anti-tank missiles supplied by the US and Estonia. Since the invasion, shares in both US companies Lockheed and Raytheon have risen by around 16% and 3%, respectively, while the S&P 500 index has fallen 1%. BAE Systems, the largest manufacturer in Europe, grew by 26%. Of the five largest defense companies in the world in terms of revenues, only Boeing saw a decline, partly due to involvement in airlines[5].

Apart from food products, energy and raw materials, the arms product has become a basic necessity product.

The aim of this article is an attempt to indicate the determinants of the armaments industry strategy of the times of war and unrest.

In order to achieve this aim, the starting point was a literature review in terms of the subject of the study. Then, the issue of the place of the arms industry in the state security system was presented, pandemic and war were indicated as determinants of changes in the economy and attention was paid to the shape of the Polish defense industry. The last part of the article analyzes military spending in the context of membership in NATO and the EU.

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[4] Patriarcha Cyryl oskarża Zachód o wywołanie wojny. „Rusofobia rozprzestrzenia się”, https://stacja7.pl/ze-swiata/patriarcha-cyryl-oskarza-zachod-o-wywolanie-wojny-rusofobia-rozprzestrzenia-sie/ (access: 30.06.2022).

[5] Giganci branży obronnej po cichu zarabiają miliardy na wojnie w Ukrainie, https://forsal.pl/biznes/przemysl/artykuly/8377224,giganci-branzy-obronnej-zarabiaja-miliardy-na-wojnie-w-ukrainie.html, published March 11, 2022 (access: 30.06.2022).

The following research methods were used in the article: literature search, analysis of documents and statistical data.

There are no compact studies on issues in the area of management and strategy of the arms industry in Poland and it is also difficult to find synthetic studies on the principles of the functioning of the economy in the face of war threats.

The article uses the analysis and research results of one of the authors included in his doctoral dissertation entitled "Innovation management in the aviation segment of the defense industry in Poland", defended at the War Studies University in February 2022. The work describes, inter alia, general characteristics of military equipment which is characterized by:

- high level of technological complexity; the use of unique, newest available technologies requiring advance work (new technologies);
- high cost of risky industrial research, exceeding the possibility of financing it only from enterprises' own funds;
- a long design cycle of 5 to 10 years for the most complex products;
- a production cycle of 2-3 years;
- long service life of military equipment, more than 20 years;
- the use of critical technologies which, for strategic reasons, should be produced by domestic industry.

It has been indicated that these factors determine business risks that cannot be overcome without a significant and active state policy. The above criteria were factors that had a fundamental influence on the operation of the arms industry in peacetime.

An interesting contribution to the discussion about the shape of industry in the face of the war threat is the pre-war work by W. Krzyżanowski "Financing a Modern War" which includes the characteristics of the war economy that is primarily purposeful and planned. "In normal times, all needs are as if they are equal (...) During the war preceding it, we create (...) hierarchies of goals (...) The organization of economic life, the discipline of production, distribution and consumption, the planned economy becomes more and more important in the face of war". The second feature of the war economy is secrecy and non-transparency, and the third is flexibility ... "and the ability to make a number of combinations (...) in the event of a shortage of certain raw materials (...)". The author points out that "War is an incentive for new inventions, for technical improvements and usually is a turning point in the development of industry. The war economy is particularly pliable and flexible"[6].

**THE PLACE OF THE ARMAMENTS INDUSTRY IN THE STATE SECURITY SYSTEM**

State security results from the fact of the state organization of society. National security is related to the development of the state and the uninterrupted functioning of the society that inhabits it[7].

State security is most often identified with the military dimension, i.e. the ability to ensure the protection of the nation and territory against an armed attack and the ability to resist it[8]. Military security is the state obtained as a result of maintaining properly organized and equipped armed forces and concluded military alliances, as well as having a concept of strategic use of the forces at the disposal, appropriate to the situation[9]. According to W. Kitler, military security is a process involving various activities in the field of national security, the main purpose of which is to counteract threats that may lead to the use of military force or to oppose the actual use of military force in relations between various entities, usually states but also internal entities of the state by protecting against such threats and their negative effects. (...) in fact, the state not only opposes military actions but also other factors having their source in the state's diplomatic, economic, normative environment as well as opposing these factors[10].

The state of the country's security is a derivative of the importance given to defense by state authorities, both in the short and long term. The high rank in this regard manifests itself mainly in the care for the defense potential, which consists mainly of the Armed Forces and the defense industry requiring appropriate financial outlays for this purpose, even at the cost of abandoning important plans in other areas.

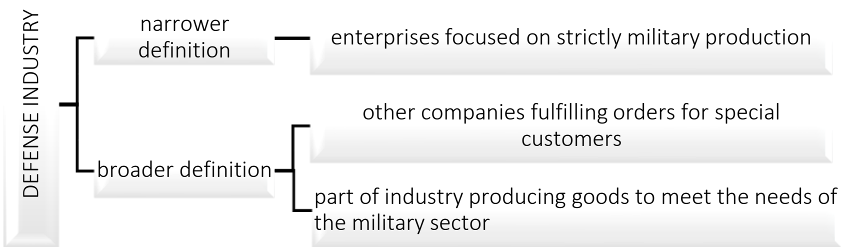
[6] W. Krzyżanowski, *Finansowanie wojny współczesnej*, Wyd. Towarzystwa Katolickiego Uniwersytetu Lubelskiego, Lublin 1938, p.15-16
[7] W. Kitler, *Bezpieczeństwo narodowe RP. Podstawowe kategorie*. Uwarunkowania. System, AON, Warszawa 2011, p. 30
[8] M. Pietraś, K. A. Wojtaszczyk (ed.), *Polska w systemie bezpieczeństwa międzynarodowego,* wydawnictwo ASPRA, Warszawa, 2016, p. 77.
[9] J. Kaczmarek, W. Łepkowski, B. Zdrodowski (ed.), *Słownik terminów z zakresu bezpieczeństwa narodowego*, AON, Warszawa 2008, p. 21.
[10] W. Kitler, *Bezpieczeństwo narodowe RP op. cit.*, p. 47.

The defense industry consists of specialized branches and plants of the national economy whose goods (including weapons and military equipment) and services are used to meet the defense needs of the state[11].

The defense industry is an integral part of the industry, encompassing industries and enterprises producing for the defense needs of the state, with defense production usually being only part of the overall production[12]. Such a definition allows to include in this category all specialized production enterprises producing combat assets and technical equipment for the needs of security and defense[13]. Taking into account the objective, subjective and spatial aspects, the defense industry can be defined in two terms, narrower and broader (Figure 1).

Figure 1.

Defining the defense industry




Source: self study based on: P. Zamelek, *Kierunki współczesnej transformacji wybranych przemysłów obronnych jako aspekt wojny handlowo – gospodarczej*, [in:] Płaczek J. (ed.), *Współczesna wojna handlowo-gospodarcza*, Difin, Warszawa 2015, pp. 375 - 376.

In the literature on the subject, the term arms industry is quite commonly used, although its meaning has evolved in recent decades and until the end of the Cold War period it was also referred to as the war industry. In this context, the arms industry is a specialized part of the national industry dealing with the production of arms and military equipment, providing the armed forces with the means to perform tasks resulting from the adopted defense doctrine and state policy[14].

[11] M. Pietraś, K. A. Wojtaszczyk (eds), Polska w systemie, op. cit., p. 78
[12] J. Kaczmarek, W. Łepkowski, B. Zdrodowski (eds), *Słownik terminów*, op. cit., p. 110.
[13] J. Wróbel J., *Przemysł obronny* op. cit., p. 132.
[14] P. Zamelek, *Przemysł obronny*, [in:] Płaczek J. (eds), *Ekonomika bezpieczeństwa państwa w zarysie,* Difin, Warszawa 2014, pp. 121 - 122.

According to S. Kurek, the category of the defense industry should not be used synonymously with the notion of the arms industry. The defense industry refers to an extremely wide range of production activities and goods, the functional features of which do not have to determine their exclusive use by the defense sector but on the contrary, their high quality usually makes them readily purchased by civilian recipients. On the other hand, the arms industry is a sector subject to special control of the state and its specialized security services because its activity is strictly focused on the production of means of combat (weapons) and thus the possibility of their acquisition by entities from outside the defense area is very small. It can therefore be said that the arms industry is a separated, usually highly specialized and particularly protected part of the defense industry[15]. K. Hartley defines arms industry as all firms involved in the design, development, production, and sale of arms where these are defined as lethal equipment[16].

The arms industry is one of the key elements of the economic and defensive potential understood as the ability to take collective action, expressed in production and service capacities focused on the needs of peace and the needs of war. Having such a potential is an important component of military sovereignty and, consequently, political sovereignty. The development of the arms industry is conditioned by assumptions relating to the construction of the operational capabilities of the armed forces, resulting from the international policy pursued by a given country, geopolitical location, and importance on the international arena.

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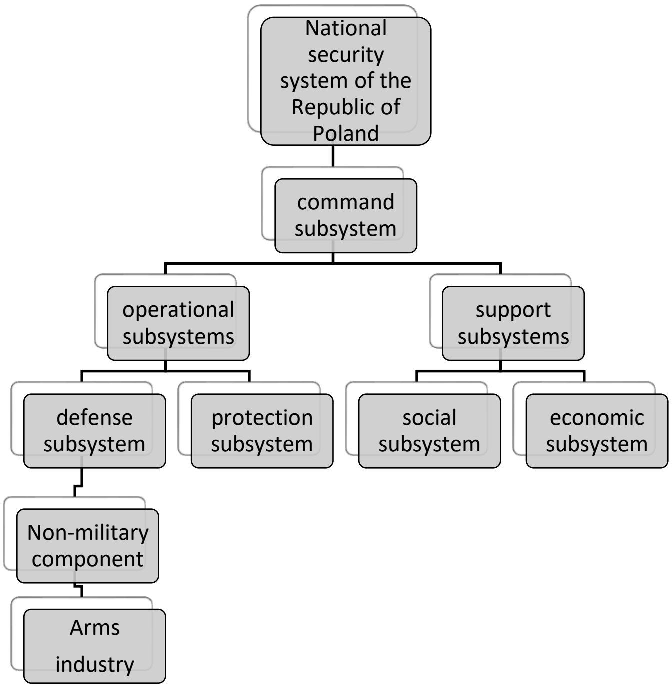
[15] S. T. Kurek, *Ekonomika obronności, Istota, miejsce, zarys teorii,* AON, Warszawa 2015, p. 155.

[16] K. Hartley, *Arms industry data: Knowns and unknowns*, THE ECONOMICS OF PEACE AND SECURITY JOURNAL Vol. 13, No. 2 (2018) | doi:10.15355/epsj.13.2.30, p. 31.

Figure. 2.

The place of the arms industry in the national security system




Source: self study based on: M. Kuliczkowski, M. Sawicki, *Pozamilitarne przygotowania obronne w Polsce*, Wydawnictwo Akademii Sztuki Wojennej, Warszawa 2019, p. 23.

The needs related to the implementation of the broadly understood security policy affect the planning, development and budgeting of public finances for defense-related purposes and, consequently, the plan of technical modernization of the armed forces[17]. Ultimately, the structure of the arms industry results from the state's production capacity and specialization, as well as from the reported demand from the domestic armed forces and export capabilities[18].

The place in the defense system of companies producing armaments is determined by four basic functions performed by them[19]:

1) delivery of goods necessary for the proper functioning of the military, in particular combat means (arms, ammunition, military equipment);

[17] K. Dymanowski, A. Nowakowska--Krystman (eds), *Uwarunkowanie zewnętrzne zarządzania przedsiębiorstwem zbrojeniowym*, Wyd. Akademii Sztuki Wojennej, Warszawa 2018, p. 18.

[18] S.T. Kurek, *Koniunktura gospodarki obronnej. Syntetyczne ujęcie modelowe*, AON, Warszawa 2011, p. 36.

[19] M. Sułek, *Funkcje przemysłu zbrojeniowego w systemie obronnym Polski*, [in:] P. Soroka (ed.), *Tradycje, stan i perspektywy polskiego przemysłu zbrojeniowego (ze szczególnym uwzględnieniem dawnego Centralnego Okręgu Przemysłowego,* Wydawnictwo WSEiP, Kielce 2011, p. 38.

2) carrying out scientific and research works, in particular research and development works aimed at developing new types and types of weapons as well as equipment for soldiers in order to improve their efficiency and effectiveness;
3) ensuring the level of mobilization readiness of the industrial and production base adequate to the threat by maintaining production capacity reserves as well as accumulating inventories (raw materials, materials, semi-finished products, finished products, goods);
4) strengthening the status of the state on the international scene by having its own national arms industry.

Many countries are trying to develop their own defense industry because of its political and strategic importance. This includes, such as the production of military equipment, weapons and ammunition. The defense industry also includes specialized branches, such as military aviation enterprises, military automotive enterprises, shipyards or military equipment plants. A characteristic feature of the defense industry is the difficulty of fitting it into a single industry. Defense companies operate in many industries that use advanced technologies, including the following: metallurgy, electrical engineering, electronics, information technology, aerospace, chemicals and precision engineering[20].

S. T. Kurek pointed out that during the war crisis the arms industry performs particularly difficult tasks related to economic and military mobilization. All reserves and production capacity are launched and thus the civil buffer production carried out in armaments entities disappears. The dynamically growing needs of the armed forces, additionally exacerbated by the pressure of time, make it possible to achieve this, provided that we prepare for this moment in advance through economic and defense planning and programming in the period of peace. The observed change in the general structure of production, related to the dynamic militarization of ever larger areas of the national economy, breaks the existing cooperation ties and creates completely new entities working for the needs of the conflict[21]. S. T. Kurek points out that shifting the economy into warfare requires the implementation of a number of undertakings, such as, inter alia, the provision of personal and material benefits ensuring mobilization development of the armed forces; mobilizing some sectors of the national

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[20] J. Antczak, I. Horzela, A. Nowakowska-Krystman, *Influence of Financial Liquidity on the Competitiveness of Defense Industry Enterprises*, European Research Studies Journal Volume XXIV, Issue 2, 2021, DOI:10.35808/ersj/2125, p. 262.
[21] S. K. Kurek, *Ekonomika obronności op. cit.*, p. 165-166.

economy, e.g. industry, agriculture, transport, communications, healthcare, municipal enterprises; changing directions of investing; redistribution of employment between sectors of the national economy; introducing a priority for the production and repair of armaments and equipment for the needs of the armed forces, the Ministry of the Interior and civil defense; introduction of resource rationing and new rules for their distribution; establishing trade contacts with new foreign partners; organizing the process of managing the national economy. The economy is responsible for creating a supply base for the needs of the armed forces and ensuring the ability to function in the broadly understood technical infrastructure of the country which determines the performance of defense tasks[22].

M. Zachara stated that contemporary wars in the Western world are conducted in a multilateral manner creating the need for synchronization of weapons systems and unification of the level of weapons. This synchronization often takes place at the production level that brings tangible economic benefits but also risks related to the expansion of the group of countries capable of producing technologically advanced defense systems[23].

In the report of the Strategy & Future, a team working under J. Bartosiak's direction presented the assumptions for a comprehensive reorganization of defense activities, the so-called New Model Army. The authors pointed out that without social support and a discussion on the depth and scope of reforms, no changes will be successful. The authors indicated that due to the nature of the modern battlefield and a low saturation with living force the new war will be non-linear and without established fronts known from the conflicts in the 20th century. The saturation with sensors and reconnaissance systems is supposed to be significant. Information domination translates into other principles of the functioning of the army and weapon systems on the battlefield[24].

## PANDEMIC AND WAR DETERMINANTS OF CHANGE IN THE ECONOMY

In addition to the harm and suffering of civilians, brutal hostilities cause severe economic disruption. The destruction of production plants, disruptions to the functioning of supply chains and displacement of the population often lead to a sudden and permanent interruption of economic activity. The prelude to the situation after Russia's attack on Ukraine

[22] S. T. Kurek, *Koniunktura gospodarki obronnej op. cit.*, pp. 35-36.
[23] M. Zachara, *Broń i dyplomacja op. cit.* 2010, p. 121.
[24] J. Bartosiak (ed.), *Armia Nowego Wzoru,* Wyd. Zona zero, Warszawa 2022, p. 39.

in February 2022 was nearly two years of the global SARS-Cov2 virus pandemic. Global chains of industrial cooperation were shaken sharply in 2020, when individual countries with China, being key to international supply, closed themselves by introducing restrictions at various levels. In a number of countries, instruments of direct influence of the state on the economy were used manifesting in various types of shield, i.e. actual cash injections into the market to stabilize the situation in enterprises.

In the situation of the war in Ukraine, war regulations were directly applied in the USA. On April 26, 2022, the House of Representatives approved a bill to restore the World War II Lend-Lease program. The new law will allow for more efficient shipment of weapons, ammunition and military equipment to Ukraine[25].

The Russian invasion of Ukraine has shown how little time Poland has to move from peace to crisis and then to the time of war. Not having the necessary back-up facilities in one's own industry blocks production from being restarted during the war. The same applies to the sudden need to increase the production of, for example, ammunition or explosives. Defense companies can do this quickly only if they are prepared to do so. Therefore actions should be agreed and properly prepared and financed. Until now, this was the purpose of the Economy Mobilization Program, under which enterprises important from the point of view of defense were paid funds to cover the costs of maintaining the appropriate production and service potential. The new law on defense of the Fatherland describes the organization of tasks carried out by entrepreneurs for the Armed Forces. It also introduces the Plan of Securing the Needs of the Armed Forces implemented by entrepreneurs. This plan, after additional arrangements between the minister of national defense and the minister coordinator of special services, may cover not only military needs but also the needs of special services. The plan defines the tasks that may be imposed on entrepreneurs performing tasks for the Armed Forces, production and service capabilities of entrepreneurs covered by the plan, a list of cooperators and subcontractors (who are suppliers of materials, raw materials, assembly components, subassemblies and devices to secure the implementation of tasks) and a list of needs regarding the creation of strategic reserves. The newly introduced plan will be created every five years. This period may be shortened in the event that its updating requires a change in its structure

[25] *Kongres USA ostatecznie zatwierdził przywrócenie ustawy Lend-Lease dla Ukrainy*, https://www.polsatnews.pl/wiadomosc/2022-04-28/kongres-usa-ostatecznie-zatwierdzil-przywrocenie-ustawy-lend-lease-dla-ukrainy/ (access: 23.06.2022).

or causes difficulties in using it. In other cases, the plan may be updated in terms of e.g. significant changes in the assortment and the number of reported needs, changes in the rules for determining the needs for the plan or changing the offer in the field of production, repairs or services of entrepreneurs, resulting in the need to change the entrepreneur performing the tasks.

The formulation of tasks for the industry will require a different perspective than before. It should be assumed that action must be taken immediately and that there is no time for action in the long term. The military threat is already measurable[26].

Since Russia invaded Ukraine, the geopolitical situation in the world has changed dramatically. Central and Eastern Europe has become the political divide between Russia and the rest of the world supporting Ukraine's defense of independence. Poland became a "front" state, similar to Israel whose economic and political stabilization was the foundation of the stability of the situation in the entire area of the Persian Gulf for the United States as a global power. How did Israel survive? The basic determinant of Israel's survival was the American economic aid and it should be assumed that also in the event of an imbalance in Central and Eastern Europe, the USA will be willing to participate in the defense expenditures of countries, in particular Poland, Romania and the Baltic states[27].

US aid to Israel for defense and security projects for 2019-2028 amounts to USD 38 billion. It is worth noting that Tel Aviv had the opportunity to expand its own industry with the help of American funds. And this to a degree that allows it to compete with American companies[28]. In talks on Poland's cooperation with the US, it is worth referring to the mechanisms developed by the US in relations with Israel, when both countries cooperated in the constant threat from the Islamic world, analogically to the Russian threat that will not disappear in the short term.

In the case of Poland's debt to the USA as of 2021, it was about USD 3.5 billion[29]. The equivalent of servicing this debt in the order of dozens of millions USD may not be sufficient to

[26] J. Graf, Przemysł alarmuje: zagrożona mobilizacja polskiej gospodarki na czas wojny, https://defence24.pl/przemysl/przemysl-alarmuje-zagrozona-mobilizacja-polskiej-gospodarki-na-czas-wojny (access: 03.07.2022).
[27] M. Zachara, *Broń i dyplomacja …*, op. cit., p.152.
[28] see: *38 mld USD pomocy wojskowej dla Izraela. „Obrona przeciwrakietowa",* https://defence24.pl/sily-zbrojne/38-mld-usd-pomocy-wojskowej-dla-izraela-obrona-przeciwrakietowa (access: 03.07.2022).
[29] *Kto jest największym posiadaczem polskiego długu?* https://www.skarbiec.biz/gospodarka/kto-jest-najwiekszym-posiadaczem-polskiego-dlugu.html (access: 03.07.2022).

significantly strengthen Poland’s defense potential, though it may be one of the important support mechanisms.

## THE SHAPE OF THE POLISH ARMAMENTS INDUSTRY IN THE TIME OF WAR

After February 24, 2022, Poland became a “front” state, thus forcing the process of “militarization” of the entire industry. All branches of the economy became directly or indirectly responsible for strengthening the state’s security. The domestic arms industry must go beyond corporate structures. The speed of action becomes a determinant of the functioning of the arms industry. It is necessary to cooperate with enterprises so far not active in the processes of arms production. For example, the efficiency of production will have to be demonstrated when executing a commercial order for a new Borsuk infantry fighting vehicle. In 2022, four “Borsuk” infantry fighting vehicles will probably go to the Polish Army for testing. The Polish Army expects that by 2035 it will receive over half a thousand Borsuk IFVs enabling the completion of 10 mechanized battalions[30]. A question should be asked whether this period can be shortened by increasing cooperation among entities with appropriate production competences.

On the basis of the research conducted by one of the authors of the article, while writing the doctoral dissertation “Innovation management in the aviation sector of the defense industry”, it was shown that there is no permanent and coherent and, above all, long-term defense policy of the state and as its result there is no industrial strategy[31]. The research was carried out by the method of a diagnostic survey, using the technique of expert interview. The interviews were conducted with six experts, current and former employees of the PGZ S.A. capital group. The interviews were conducted from August until September 2020. The experts reserved anonymity.

It was shown then that there are no answers to the questions: What technologies are developed within the state, which are developed under international partnerships, which are purchased, where are investments made, especially in R&D centers? There was no such

[30] B. Breczko, *Nowy polski wóz bojowy „Borsuk” może być produkowany od 2023 roku,* https://biznes.wprost.pl/technologie/10668757/nowy-polski-woz-bojowy-borsuk-moze-byc-produkowany-od-2023-roku.html (access: 30.06.2022).
[31] A. Stolarz, *Zarządzanie innowacjami w segmencie lotniczym przemysłu zbrojeniowego w Polsce*, Akademia Sztuki Wojennej, a PhD thesis defended on February 17, 2022

strategy at the origin of the Bumar group in 2002, as well as the PGZ Group in 2014. It still does not exist. PGZ S.A. has become a neoBumar launched in a virtually unchanged strategic shape.

Experts negatively assessed the effectiveness of decision-making processes on investment directions in industry and the dialogue between the Polish Armed Forces and the defense industry in Poland. They also pointed to the lack of feedback on the line of the Ministry of National Defense and the industry - e.g. binding declarations of interest in given innovative projects. In conversations with them, statements were made that there was no dialogue between the Armed Forces and the industry. The problem is to be solved by the Armaments Agency - consolidating in its hands a number of competences of the Ministry of Defense Policy Department and the Armament Inspectorate but whether it will be possible without the armaments policy, time will tell. Such problems will be very difficult to address in the light of the current geopolitical situation.

During the interviews, the experts pointed to the following issues: the level of innovation within PGZ S.A. is heterogeneous and often at a very low level; PGZ S.A. should be an active intermediary between the Ministry of National Defense and initiators of innovative projects from production companies, instead of just acting as their administrator; the need to fully cover the costs of R&D, ensuring sustainable sources of financing, continuity and consistency of R&D works; lack of practical understanding of what innovation is and the actual lack of mechanisms introducing a policy of building a competitive advantage based on innovative products; the vision of building an advantage based on innovation must be combined with technological capabilities to create it in real terms, and without competitive and modern manufacturing techniques, the vision of the arms industry based on innovation cannot be materialized; the system of supporting innovation in the military market is insufficient; no clear path of commercialization of elaborated technological solutions has been developed; gradual resignation by the Ministry of National Defense from the development of Polish technical solutions and the implementation of new technologies in favor of purchasing ready-made equipment, mainly abroad; determining the tactical and technical requirements of the needs of the armed forces, clearly communicating them to the industry and then consistent financing of launched projects and keeping the requirements unchanged; no support for companies from the PGZ S.A. Group in terms of participation in international alliances.

In summary, the experts indicated that the Polish defense industry is to a large extent a recipient of production solutions and uses massively products, semi-finished products, licenses, documentation and prescriptions of foreign origin without the participation of Polish innovations. There is a noticeable lack of domestic highly specialized production technologies and the lack of technology flow from Poland to the world. The solution to this problem may be the establishment of closer cooperation between the armaments industry in Ukraine. Shifting the burden of developing the Ukrainian arms industry to Poland will make it possible to reduce the risk in the event that, after the expected ceasefire or any "rotten compromise", Russia will again attempt to use forceful solutions in Ukraine.

Mutual exchange of experiences in the arms industry and transfer of some competences to Poland could strengthen both sides economically and increase production security in the face of the constant threat from Russia. It is not important that Ukraine is not a NATO member, assuming the need to rebuild Ukraine also as a barrier against a possible further attack by Russia, the integration of armaments companies, for example by launching joint R&D centers, will become a necessity, to which legal and formal issues will have to be adjusted (internal regulations, the so called "Chinese walls")

It would be important for the Polish industry to take advantage of the efficiency of the Ukrainian side in the search for export opportunities, as well as in the conducted research and development works. Ukrainian plants took part in projects such as the Super Hind helicopter, i.e. a deep modernization of the Mi-24 carried out jointly with South Africa for Azerbaijan. Weapons and avionics were supplied by South Africa, Ukrainian plants modified the propulsion system and produced engines. In exchange for Bayraktar TB2 drones, Ukraine exports to Turkey, among others, aircraft engines and guided missiles and the equipment necessary for their use. This experience would undoubtedly be of use to the Polish domestic industry. Ukroboronprom has so far focused on foreign expansion in addition to supplying its own armed forces and PGZ S.A. focuses almost entirely on the domestic market, not intensively looking for export opportunities. This creates opportunities to search for sources of synergy, especially since the competences of Poland and Ukraine are similar in many areas, and therefore based on the foundations of post-Soviet technologies and the development of own solutions or licensed products. Export markets should also be similar - users of equipment similar to that used in the Polish Army wanting to modernize and countries that cannot afford American or French equipment.

**MILITARY EXPENDITURE IN THE CONTEXT OF MEMBERSHIP WITH NATO AND THE EU**

Historical experience shows that the mere conclusion of treaties does not guarantee real help during a period of trial (September 1939).

The security guarantees provided by NATO members to each other are enshrined in Article 5 of the North Atlantic Treaty as follows: "The parties agree that an armed attack against one or more of them in Europe or North America shall be considered an attack against them all and consequently they agree that if such an armed attack occurs, each of them (...) will assist the Party or Parties so attacked by taking forthwith, individually and with concert with the other Parties, such action as it deems necessary, including the use of armed force, to restore and maintain the security of the North Atlantic area". This provision leaves individual NATO members full freedom to choose the form of assistance provided to the attacked, which, combined with the requirement for the Allies to reach a consensus in order to decide on a collective response to an armed attack, puts into question the adequacy ("hardness") of the guarantees contained in Article 5. In this context, the need for continuous efforts to maintain NATO's credibility, cohesion and strength is extremely important[32].

After Russia's attack on Ukraine, the consolidation of NATO around the basic defensive function based on Article 5 of the North Atlantic Treaty and carrying out real actions to strengthen the Alliance's deterrent force seems to be the most necessary. In particular, it would be about:

a) maintaining defense spending by Member States at 2% of GDP;
b) even development of allied infrastructure in the Member States;
c) consistent construction of the allied anti-missile defense system;
d) conducting joint exercises with the participation of troops (including scenarios based on collective defense)
e) cyclical preparation and updating of allied contingency plans.

NATO's armed forces should be capable of countering the classical armed forces of the state and carrying out high-intensity operations. However, the biggest challenge will be the confrontation with the enemy using hybrid actions, although not always actions related to ensuring security will require direct confrontation with the enemy and conducting combat

[32] J. Antczak, *Bezpieczeństwo militarne Polski – wybrane problemy*, [in:] R. Wróblewski, H. Wyrębek, *Determinanty bezpieczeństwa militarnego*, Pracownia Wydawnicza Wydziału Humanistycznego UPH, Siedlce 2016, p. 61.

operations. Often these may be activities of a peace and stabilization nature, humanitarian operations or various other activities aimed at supporting civilian authorities. The importance of conflict prevention activities by the armed forces is also growing steadily[33].

The European Union and its Common Security and Defense Policy are the cornerstone of European security. Pursuant to Art. 42 sec. 7 of the Treaty on European Union, in the event that any Member State is the victim of an armed aggression on its territory, the other Member States shall have towards it an obligation of aid and assistance by all the means in their power, in accordance with Article 51 of the United Nations Charter. This provision provides treaty security guarantees analogous to those resulting from Article 5 of the North Atlantic Treaty Organization and thus they do not bring any added value for the majority of the EU members. After February 24, 2022, these guarantees turn out to be extremely important.

The improvement of the Common Security and Defense Policy will depend both on the political will of the Member States and the development of institutions, capacity building and active operational involvement of the EU in its neighborhood.

The development of European military capabilities is primarily aimed at:

a) the pooling and sharing initiative;
b) adaptation of the concept of the EU Battle Groups to real operational needs by increasing the possibility of their use;
c) establishing a permanent EU planning and command structure at operational level and
d) developing the practical dimension of EU cooperation with NATO.

According to a report by the Stockholm International Peace Research Institute (SIPRI) in 2021 world military expenditure surpassed the two trillion US dollar mark for the first time, reaching $ 2113 billion. Global spending in 2021 was 0.7 per cent higher than in 2020 and 12 per cent higher than in 2012. The economic effects of the Covid-19 pandemic have not ended the continuous upward trend in world military expenditure seen since 2015. As a result of the strong economic recovery across the globe in 2021, world military spending as a share of world gross domestic product (GDP) —the global military burden — reached 2.2 per cent, down from 2.3 per cent in 2020. Average military spending as a share of government expenditure in 2021 remained the same as in 2020, at 5.9 per cent[34].

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[33] M. Banasik, *Zdolności NATO do działań ekspedycyjnych w przyszłym środowisku bezpieczeństwa międzynarodowego*, Difin, Warszawa 2015, p. 125.
[34] D. Lopes da Silva, N. Tian, L. Béraud-Sudreau, A. Marksteiner, X. Liang, *Trends in world military expenditure*, 2021, https://www.sipri.org/sites/default/files/2022-04/fs_2204_milex_2021_0.pdf, p. 1 (access: 01.07.2022).

The most important conclusions of the SIPRI report are:

1) World military expenditure surpassed the two trillion US dollar mark for the first time, reaching $ 2.1 trillion in 2021.
2) The five largest military spenders in 2021 were the United States, China, India, the United Kingdom and Russia, which together accounted for 62 per cent of world military spending. The USA and China alone accounted for 52 per cent.
3) In 2021 China's military spending rose for the 27th consecutive year, to reach $ 293 billion.
4) Russia's military expenditure grew for the third consecutive year in 2021. Spending rose by 2.9 per cent, to reach $ 65.9 billion, or 4.1 per cent of gross domestic product (GDP).
5) Military expenditure grew in three of the world's five regions in 2021. Spending increased in Asia and Oceania (3.5 per cent), Europe (3.0 per cent) and Africa (1.2 per cent). Spending decreased in the Middle East (–3.3 per cent) and the Americas (–1.2 per cent).
6) World military spending as a share of global GDP reached 2.2 per cent in 2021, 0.1 percentage points lower than in 2020.
7) Countries allocated an average of 5.9 per cent of their total government budgets to their militaries in 2021 — the same proportion as in 2020.

According to the expert of the Stockholm International Institute for Peace Research (SIPRI) Diego Lopes da Silva, who told the AFP news agency: Russia was arming en masse before the invasion of Ukraine. Moscow's military spending increased by 2.9 percent year on year - to $ 65.9 billion (EUR 60.9 billion). Defense spending accounted for 4.1 of Russia's GDP, well above the world average. Thus, Moscow has become the fifth largest country in the world on armaments. High revenues from the sale of oil and gas helped Moscow to increase its military spending.

According to the SIPRI report, Ukraine's military spending has increased by 72% since the annexation of Crimea. In 2021, Ukrainian spending fell by more than eight percent to 5.6 billion euros, but still accounted for 3.2 percent of Ukraine's GDP.

In 2021, defense spending was increased by almost all NATO member states (Table 1). In 2021, Germany spent EUR 51.8 billion on defense, which is 1.3 % GDP. This puts the Federal Republic of Germany in third place in the spending ranking of Central and Western European countries. According to the report, Poland was ranked 20th in global defense spending in 2021 (down from 19th compared to 2020) and amounted to USD 13.7 billion, i.e. 5.1 percent less than in the previous year. At the same time, it was 2.1% of Poland's GDP (compared to 1.8% of GDP in 2012) and accounted for 0.6% of global defense spending. Globally, the United States spent the most on defense in 2021 - USD 801 billion, which is a decrease of 1.4% compared to 2020. The US defense budget of the National Defense Authorization Act slightly decreased from 3.7% of GDP in 2020 to 3.5% in 2021. US defense research and development (R&D) funding increased by 24 percent between 2012 and 2021, while arms procurement funding decreased by 6.4 percent over the same period. In 2021, funding for both goals decreased. The decrease in R&D expenditure, amounting to –1.2%, was, however, smaller than in the expenditure on military orders, i.e. –5.4%[35].

Table 1

The level of defense spending of NATO countries as a percentage of GDP in 2010-2021

| Year | Albania | Belgium | Bulgaria | Canada | Croatia | Czechia |
|---|---|---|---|---|---|---|
| 2010 | 1,6% | 1,1% | 1,9% | 1,2% | 1,7% | 1,2% |
| 2011 | 1,6% | 1,0% | 1,5% | 1,2% | 1,8% | 1,1% |
| 2012 | 1,5% | 1,0% | 1,6% | 1,1% | 1,7% | 1,0% |
| 2013 | 1,4% | 1,0% | 1,7% | 1,0% | 1,7% | 1,0% |
| 2014 | 1,3% | 1,0% | 1,5% | 1,0% | 1,6% | 1,0% |
| 2015 | 1,1% | 0,9% | 1,4% | 1,0% | 1,6% | 1,0% |
| 2016 | 1,1% | 0,9% | 1,2% | 1,2% | 1,6% | 1,0% |
| 2017 | 1,1% | 0,9% | 1,2% | 1,4% | 1,6% | 1,0% |
| 2018 | 1,2% | 0,9% | 1,5% | 1,3% | 1,6% | 1,1% |
| 2019 | 1,3% | 0,9% | 3,1% | 1,3% | 1,6% | 1,2% |
| 2020 | 1,3% | 1,0% | 1,5% | 1,4% | 1,8% | 1,3% |
| 2021 | 1,4% | 1,1% | 1,6% | 1,3% | 2,7% | 1,4% |
| Year | Denmark | Estonia | France | Germany | Greece | Hungary |
| 2010 | 1,4% | 1,8% | 2,3% | 1,4% | 2,7% | 1,0% |
| 2011 | 1,3% | 1,7% | 2,3% | 1,3% | 2,5% | 1,1% |
| 2012 | 1,4% | 1,9% | 2,2% | 1,3% | 2,4% | 1,0% |
| 2013 | 1,3% | 1,9% | 2,2% | 1,2% | 2,3% | 1,0% |
| 2014 | 1,2% | 2,0% | 2,2% | 1,2% | 2,3% | 0,9% |
| 2015 | 1,2% | 2,0% | 2,1% | 1,2% | 2,6% | 0,8% |

[35] after: R. Muczyński, *SIPRI: Globalne wydatki na obronność przekroczyły 2 biliony USD,* https://milmag.pl/sipri-globalne-wydatki-na-obronnosc-przekroczyly-2-biliony-usd/ (access: 01.07.2022).

| | | | | | | |
|---|---|---|---|---|---|---|
| 2016 | 1,1% | 2,1% | 1,9% | 1,1% | 2,6% | 1,0% |
| 2017 | 1,1% | 2,0% | 1,9% | 1,2% | 2,6% | 1,0% |
| 2018 | 1,3% | 2,0% | 1,8% | 1,2% | 2,7% | 1,1% |
| 2019 | 1,3% | 2,0% | 1,8% | 1,3% | 2,7% | 1,3% |
| 2020 | 1,4% | 2,4% | 2,0% | 1,4% | 2,8% | 1,9% |
| 2021 | 1,4% | 2,2% | 1,9% | 1,3% | 3,9% | 1,6% |
| Year | Iceland** | Italy | Latvia | Lithuania | Luxembourg | Montenegro |
| 2010 | ... | 1,7% | 1,1% | 0,9% | 0,5% | 1,8% |
| 2011 | ... | 1,7% | 1,0% | 0,8% | 0,4% | 1,7% |
| 2012 | ... | 1,6% | 0,9% | 0,8% | 0,4% | 1,7% |
| 2013 | ... | 1,6% | 0,9% | 0,8% | 0,4% | 1,5% |
| 2014 | ... | 1,5% | 0,9% | 0,9% | 0,4% | 1,5% |
| 2015 | ... | 1,3% | 1,0% | 1,1% | 0,5% | 1,4% |
| 2016 | ... | 1,3% | 1,5% | 1,5% | 0,4% | 1,4% |
| 2017 | ... | 1,4% | 1,6% | 1,7% | 0,5% | 1,4% |
| 2018 | ... | 1,4% | 2,1% | 2,0% | 0,5% | 1,4% |
| 2019 | ... | 1,3% | 2,0% | 2,0% | 0,6% | 1,3% |
| 2020 | ... | 1,5% | 2,3% | 2,1% | 0,6% | 1,7% |
| 2021 | ... | 1,5% | 2,3% | 2,0% | 0,6% | 1,7% |
| Year | Netherlands | Northern Macedonia | Norway | Poland | Portugal | Romania |
| 2010 | 1,3% | 1,4% | 1,5% | 1,9% | 2,0% | 1,3% |
| 2011 | 1,3% | 1,3% | 1,5% | 1,8% | 2,0% | 1,3% |
| 2012 | 1,3% | 1,2% | 1,4% | 1,8% | 1,9% | 1,2% |
| 2013 | 1,2% | 1,2% | 1,4% | 1,8% | 2,1% | 1,3% |
| 2014 | 1,2% | 1,1% | 1,5% | 1,9% | 1,8% | 1,4% |
| 2015 | 1,2% | 1,0% | 1,5% | 2,2% | 1,9% | 1,4% |
| 2016 | 1,2% | 1,0% | 1,6% | 1,9% | 2,0% | 1,4% |
| 2017 | 1,2% | 0,9% | 1,7% | 1,9% | 1,7% | 1,7% |
| 2018 | 1,2% | 0,9% | 1,7% | 2,0% | 1,8% | 1,8% |
| 2019 | 1,3% | 1,2% | 1,9% | 2,0% | 1,8% | 1,8% |
| 2020 | 1,5% | 1,2% | 2,0% | 2,3% | 1,9% | 2,0% |
| 2021 | 1,4% | 1,5% | 1,8% | 2,1% | 2,1% | 2,0% |
| Year | Slovakia | Slovenia | Spain | Turkey | United Kingdom | USA |
| 2010 | 1,3% | 1,6% | 1,4% | 2,5% | 2,4% | 4,7% |
| 2011 | 1,1% | 1,3% | 1,3% | 2,2% | 2,3% | 4,6% |
| 2012 | 1,1% | 1,2% | 1,4% | 2,3% | 2,2% | 4,2% |

| | | | | | | |
|---|---|---|---|---|---|---|
| 2013 | 1,0% | 1,1% | 1,2% | 2,3% | 2,1% | 3,8% |
| 2014 | 1,0% | 1,0% | 1,2% | 2,2% | 2,0% | 3,5% |
| 2015 | 1,1% | 1,0% | 1,2% | 2,1% | 2,0% | 3,3% |
| 2016 | 1,1% | 1,0% | 1,1% | 2,1% | 2,0% | 3,4% |
| 2017 | 1,1% | 1,0% | 1,2% | 2,1% | 1,9% | 3,3% |
| 2018 | 1,2% | 1,0% | 1,3% | 2,5% | 1,9% | 3,3% |
| 2019 | 1,7% | 1,1% | 1,2% | 2,7% | 2,0% | 3,4% |
| 2020 | 2,0% | 1,1% | 1,4% | 2,4%* | 2,2% | 3,7% |
| 2021 | 1,7% | 1,2% | 1,4% | 2,1%* | 2,2% | 3,5% |

*are the SIPRI estimates
**data unavailable
Source: *SIPRI NATO milex data 1949-2021.xlsx*; http://www.sipri.org/ (access: 01.07.2022).

When analyzing the data in Table 1, it can be noticed that eleven countries of the Alliance allocated at least 2% of GDP, according to the guidelines: the USA, Greece, Poland, Turkey, Great Britain, Romania, Portugal, Lithuania, Latvia, Croatia and Estonia. Defense spending in the United States remains the highest, despite the fact that it fell from 3.7% in 2020 to 3.5% in 2021. The largest and most numerous increases in expenditure were recorded among the countries of NATO's eastern flank, including Poland.

The NATO summit held on June 29, 2022 was one of the most important meetings of the Alliance in recent years. The response to new forms of hybrid threats and the ongoing war in Ukraine poses a huge challenge, both for the organization's structures and its individual members. In the official statement issued after the Summit, it was indicated that the new strategy of NATO countries in point 3, condemns the initiation of war by the Russian Federation, also indicates non-military threats, such as the impact of the conflict on energy and food markets, as well as Russia's actions aimed at disrupting them. Information activities are also criticized. In turn, section 6, outlines the challenges coming from the areas of cyber, militarization of space and technology development. As the main threat in these planes, NATO points to China, which is to use these planes to undermine the international order. An important element of the statement is the part describing the actions taken, including: adoption of a new strategic concept, increasing the presence of allied troops on the eastern flank, declaration of further cooperation and exercises to increase joint capabilities, as well as multiple and strong declarations emphasizing the role of Article 5 and collective defense. It is also worth emphasizing the joint activities of the Alliance in the area of strengthening common energy security. In a way, in the shade of the official announcement, there was a statement about the signing of the Accession Protocol of Finland and Sweden[36].

**SUMMARY**

One of the main criteria of a country's independence and sovereignty is having its own defense industry. According to J. Olszewski, "the quite commonly used various types of restrictions in the supply of arms and economic blockades taught that it is best - if the economic potential allows it - to be independent in this field"[37]. In order for the defense industry to fulfill its role as a guarantor of sovereignty, "it must be supported by a wide range of state institutions and agencies, as well as government representatives themselves."[38] Cooperation between entities influencing the defense industry should be located "on a sequence of internal connections, on a feedback basis, from security policy, through defense doctrine, determining the needs of military operational capabilities in terms of tasks and technology, tasks for the research and development sphere and then production, import tasks in areas where the Polish industry is able to provide the necessary capabilities, service and repair needs, to determine the life cycle of individual weapon systems."[39] The defense industry in particular is as strong and resilient as the army is strong and well-organized and vice versa, the army and industry are only as strong as the state is. And the state is as strong as its army and industry.

The condition of the Polish defense industry needs to be improved, as it is one of the basic factors in ensuring national security and its ability to defend itself. The competitiveness of Polish armaments plants is insufficient for them to be able to broadly participate in the technical modernization of the Armed Forces, as well as to effectively compete on foreign markets.

The arms industry faces all sorts of threats. Taking into account the economic dimension, it is primarily the dependence of companies on the government and obtained permits for the

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[36] After: A. Sadowski, *#CyberMagazyn: Szczyt NATO w Madrycie. Najważniejsze wnioski ze sfery informacyjnej,* https://cyberdefence24.pl/cyberbezpieczenstwo/cybermagazyn-szczyt-nato-w-madrycie-najwazniejsze-wnioski-ze-sfery-informacyjnej (access: 10.07.2022).

[37] J. Olszewski, *Polityka otwartego rynku uzbrojenia a rozwój przemysłowego potencjału obronnego* [in:] A. Cyran, P. Soroka (ed.), *Szanse i zagrożenia wynikające z otwarcia europejskiego rynku uzbrojenia dla polskich przedsiębiorstw obronnych*, Wydawnictwo Uniwersytetu Jana Kochanowskiego, Kielce 2014, p. 48

[38] S. T. Kurek *Ekonomika…, op. cit.,* p. 169

[39] A. Karkoszka, *Polski przemysł obronny a wspólny rynek obronny Unii Europejskiej. Jak przekształcić zagrożenia w szanse,* [in:] A. Cyran, P. Soroka (ed.), *Szanse i zagrożenia wynikające z otwarcia europejskiego rynku uzbrojenia dla polskich przedsiębiorstw obronnych*, Wydawnictwo Uniwersytetu Jana Kochanowskiego, Kielce 2014, p. 112

production of a given type of equipment. In addition, a lot depends on the needs of the army as the main buyer of defense equipment. Another aspect of the threat to the defense industry is vulnerability to all kinds of attacks. Both in peacetime and in war as well as cyber-attacks.

The speed of action becomes a determinant of the functioning of the arms industry. It is necessary to cooperate with enterprises so far not active in the processes of arms production.

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