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Global digital transformation: new challenges and opportunities for the development of the military-industrial complex

The report analyzes the impact of global digital transformation on the development of the military-industrial potential of countries around the world. It explores how new technologies, such as artificial intelligence, cybersecurity, and automation, are changing the structure of the defense industry, increasing the efficiency of military operations, and creating new security challenges.

Development of military-industrial potential

In the context of global digital transformation, changes in national defense strategies have become an integral part of national security. The rapid development of digital technologies, including artificial intelligence (AI), automation, big data, and cybersecurity, opens up new opportunities for the development of the military-industrial potential of states. This is leading to revolutionary changes in the areas of armaments, force management, and operational planning. However, digital transformation also brings with it new challenges related to cyber threats, technological dependence, and the ethics of using the latest technologies for military purposes.

Two opposing views on the development of the military-industrial potential (MIC) and increased investment are most common: 1) Increased spending on the military-industrial complex diverts resources from solving basic socio-economic problems and indirectly contributes to the development of international conflicts due to the high profitability of arms sales on the world market; 2) Increased investment in the defense industry stimulates the development of knowledge-intensive industries, creates additional jobs and expands export opportunities. This has a positive impact on the economy and is reflected in changes in macroeconomic indicators such as GDP, employment, real incomes, and the structure of industrial production.

Further development of the military-industrial complex can provide the country with significant exports, provided that high productivity and product quality are achieved, given the high demand in the global market. As a result, the military-industrial complex is turning into a specialized sector of the national economy, financed mainly from the state budget. This creates a very attractive and profitable business. This is evidenced by the recent increase in spending on the development of the military-industrial complex around the world, as well as the fact that various information platforms, such as YouTube, actively promote various types of weapons and systems, as well as general-purpose products. The current development of the military-industrial complex within national borders is mainly determined by the foreign policy situation. The foreign policy situation is based on different economic interests, economic and security groups of each country [1, p. 3].

Military-Industrial Potential: Traditional Approaches and New Challenges

The military-industrial potential of a country is traditionally determined by its ability to produce military equipment, weapons and other means of national defense: In the 20th century, this potential was based on industrial technology, heavy industry, and mass production of weapons. However, with the advent of new digital technologies, the structure of the defense industry has changed significantly.

Today, digital transformation is facilitating the emergence of new types of weapons, such as autonomous weapons systems, unmanned aerial vehicles (UAVs), and cyber weapons. Artificial intelligence makes it possible to create automated systems for managing military operations, increasing the effectiveness of intelligence and reducing dependence on the human factor. Big data allows analyzing large amounts of information for more accurate planning and forecasting of war scenarios. All this is changing the traditional approach to military resource management and warfare.

For the industry to continue to grow, it must constantly adapt to changing challenges. This continuous adaptation is only possible through continuous innovation. Through innovation, the sector can further improve the efficiency of the entire value chain, the flexibility of its production systems to meet rapidly changing consumer needs, and remain a global benchmark for quality. Much of the innovation will involve the use of increasingly sophisticated digital technologies. More and more sensors, big data, and artificial intelligence (AI) technologies are being continuously introduced into industry to automate and network industrial processes, and the use of such advanced technologies will continue to grow [2, p. 10].

Key areas of digital transformation in the military-industrial sector

1. Artificial intelligence and automation

Artificial intelligence (AI) is already being actively used in military systems: Autonomous drones and robotic combat platforms equipped with artificial intelligence allow for the performance of combat missions without human intervention. This significantly increases operational efficiency and reduces risks for military personnel. In addition, AI is used to analyze intelligence data, model combat scenarios, and make decisions based on predicted outcomes.

As a priority for the further development of the defense industry in post-war Ukraine, the experience of other countries has proven that the application of the latest technologies, including the use of artificial intelligence (AI) and big data, will ensure a fast, efficient and flexible response to the needs of society in the post-war military security and defense of the country. Today, artificial intelligence is one of the fastest growing technological sectors in society and has great potential in many areas, including national security, defense, military medicine, military logistics, intelligence and counterintelligence, and air reconnaissance.

The importance of using artificial intelligence to ensure national security is confirmed by the results of a study conducted by the NATO Science and Technology Organization, which identified the most important technological developments for the next 20 years. According to the study, the key technologies are: big data, artificial intelligence, autonomous vehicles, space, hypersonic aircraft, quantum technologies, biotechnology, and new materials [3].

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Automation is also transforming production processes in the military-industrial complex. Robotization and automation of production lines can significantly reduce the time and cost of producing weapons and ammunition. Countries that are actively implementing automation are gaining a competitive advantage in the global arms market.

2. Cyber security and cyber weapons

Cybersecurity has become a key area of defense industry development in the context of digital transformation. Cyber threats pose a new type of challenge to national security, as national and military infrastructures can be vulnerable to cyber attacks that disable critical systems.

States are investing significant resources in building cyber defenses, developing tools to counter cyber threats, and creating national cyber teams to defend against attacks. In addition to defensive cybersecurity, countries are also developing cyberweapons - tools to attack enemy information systems. Such technologies can be used to paralyze military command and control systems, reduce the effectiveness of combat operations, and neutralize enemy critical infrastructure.

3. Autonomous combat systems and drones

Unmanned aerial vehicles (UAVs) and other autonomous weapon systems are becoming increasingly popular; UAVs are used for reconnaissance, surveillance and combat operations without direct human intervention. These systems allow operations in harsh environments, minimize military risks and increase operational flexibility.

A number of countries, including the United States, China, Israel, and Russia, are actively implementing plans to develop unmanned and autonomous combat systems with an emphasis on artificial intelligence technologies. This will create new types of weapons capable of acting independently, analyzing conditions on the battlefield and making decisions without human intervention.

4. Big data and analytics

Big data allows for detailed analysis of information from various sources, including satellite imagery, intelligence, and communications. This makes it possible to predict potential threats, analyze enemy behavior, and effectively plan military operations.

Ukraine has made digital transformation a priority policy, which includes the launch of the ProZorro system, the e-Health electronic healthcare system, the Dia.Digital Education online education platform, and 4G mobile communications (including the creation of conditions for Internet access in areas with poor signal coverage), among other achievements. Another important milestone was providing citizens with access to public documents of government agencies through personal electronic accounts with electronic digital signatures, which reduced the time and priority of document processing and reduced corruption risks. Today, thanks to the automation of the process, only about 5% of interactions with the state require direct contact between citizens and officials [5, p. 66].

In the context of Russia's all-out war against Ukraine, the focus of digital transformation has somewhat intensified in terms of improving cybersecurity, creating conditions for uninterrupted access to healthcare and education, and ensuring the functioning of the country's infrastructure. Even in this difficult context, new services and projects are being created: for example, an "electronic enemy," an "electronic home," registration of damaged property, and possible social assistance to internally displaced persons and the unemployed [6].

Big data analytics is becoming a key element in the management of modern military operations. Armed forces around the world are using these technologies to improve the effectiveness of battlefield management, logistics planning, and tactical decision-making.

Challenges of digital transformation in the military-industrial sector

While digital technologies open up new opportunities to enhance military capabilities, they also pose a number of challenges:

1. technological dependence. Dependence on digital technologies can make countries vulnerable to cyberattacks and technological failures. For example, malfunctions of artificial intelligence systems and cyberattacks can have serious consequences for military operations.

2. ethics of using modern technologies. The use of autonomous combat systems and cyber weapons raises serious ethical issues. The lack of clear international regulation of the use of such technologies can lead to their misuse and violations of international humanitarian law.

3. cyber vulnerability. The growing role of digital technologies in military operations makes states vulnerable to cyberattacks. Strategically important facilities and military systems can be compromised, requiring significant investment in cybersecurity.

Conclusion.

Global digital transformation is transforming the military-industrial potential of countries around the world. New technologies, such as artificial intelligence, cyber weapons, autonomous weapons systems, and big data, are creating new opportunities for warfare and strengthening national security. At the same time, digital transformation brings with it a number of challenges, such as cyber vulnerability, ethical issues, and technological dependence. Countries that effectively adapt to the new environment will gain significant advantages in strengthening their defense capabilities and protecting themselves from modern threats.

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