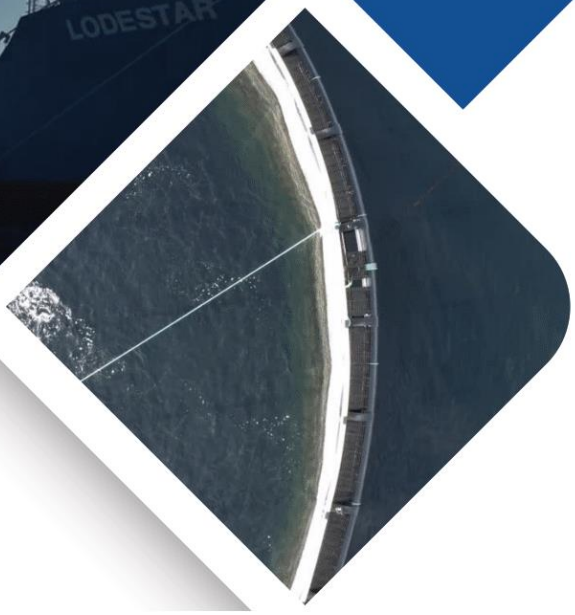
Ukrainian Maritime Cluster

NOVEMBER

2023

BLUE ECONOMY

Reliable and Timely



PREPARED
by order of the
Ukrainian Maritime Cluster

MOVING FORWARD TOGETHER
EU4Business

співпраця з німеччиною
DEUTSCHE ZUSAMMENARBEIT

EU4Business: SME RECOVERY, COMPETITIVENESS AND INTERNATIONALISATION

Implemented by: BDF

Ukrainian Maritime Cluster

CONTENTS

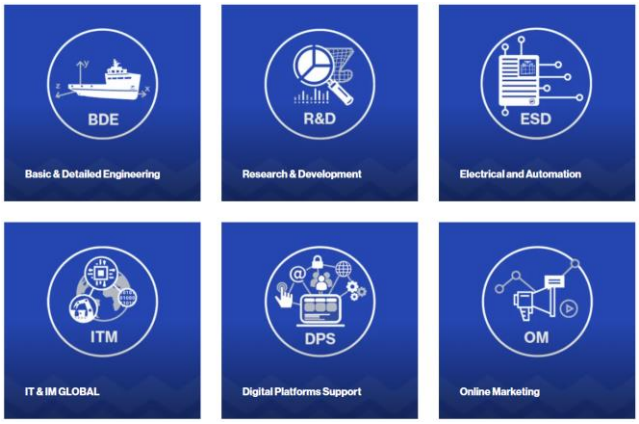
When cutting-edge technologies and engineering developments, years of experience, deep market understanding, collaboration, and a drive for change converge at one point, the Ukrainian Maritime Cluster is born. 35 companies from Ukraine's maritime industry sectors, including shipbuilding and ship repair, engineering and R&D, suppliers of maritime equipment and services, representatives of education and science, the military-maritime sub-cluster, government officials, and entrepreneurship development institutions have come together to work collaboratively on the development of the maritime industry. From the development of new technologies to supporting entrepreneurship and creating jobs, the Ukrainian Maritime Cluster creates conditions for strengthening our country's competitiveness in the maritime sector. The Ukrainian Maritime Cluster is the link that connects the entire maritime sector with other industry players, global and national regulatory bodies, policy makers, and maritime organizations.

MAIN AREAS OF ACTIVITY

- Formation of the economic, technological and political environment for the development of the Ukrainian maritime economy.
- Supporting global integration and enhancing the competitiveness of cluster members on the international stage.

The ship design sector in Ukraine

The ship design sector in Ukraine is represented by 16 companies employing approximately 900 individuals. The primary revenues in the ship design sector are generated by companies in the Mykolaiv region, and in the recent pre-war years, their volumes and market share have increased. Expanding the portfolio of completed projects, access to design solutions, and a highly qualified workforce define significant prospects for the ship design sector in Ukraine.



Shipbuilding and Ship Repair Sector in Ukraine

The total number of shipbuilding and ship navigation companies in Ukraine amounts to 451. Before the war, there were 20 shipbuilding and ship repair yards, comprising 7 major shipbuilding and 5 ship repair yards (with a workforce of over 250 employees capable of building and repairing ships exceeding 100 meters in length), 3 medium-sized, and 5 small shipbuilding yards capable of constructing ships up to 40 meters in tonnage. Additionally, there were several dozen small ship repair companies and small fleet enterprises (yachts, boats, vessels up to 24 meters in length). The capacity utilization rate was at 30-35%.

Shipbuilding and ship repair enterprises are geographically distributed in 15 regions, with the highest concentration in the Mykolaiv, Odesa, and Kherson regions. As a result, the majority of shipbuilding and ship repair services in Ukraine are concentrated in the Mykolaiv, Odesa, and Kherson

regions. These regions are home to the highest number of economic entities (80% or 359 out of 451) employing 5,846 workers (85% of all employees in the sector) and generating approximately 86% of the segment's total revenue.

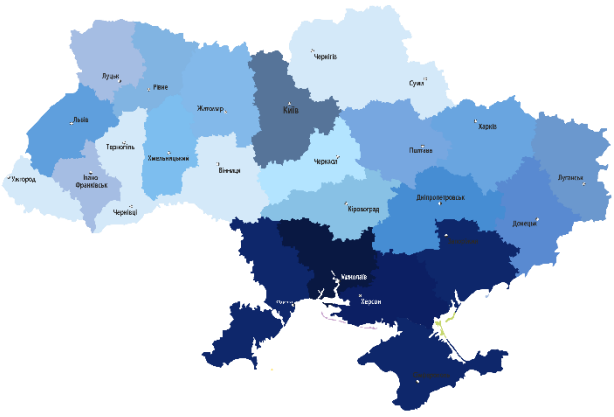
accounting for almost 87% of cargo handling volumes in Ukrainian maritime ports. Each port has its unique characteristics and potential.

The maritime and river port sector in Ukraine

Ukraine is an Eastern European maritime nation and one of the world's largest suppliers of agricultural and industrial products, many of which are exported by sea. Ukraine's ports can be categorized into four major groups: Odesa, Mykolaiv, Danube, and Azov. Cargo handling in maritime and river ports and terminals in Ukraine involves 502 business entities. Before the war, this sector employed nearly 40,000 workers. The largest maritime ports in terms of cargo handling volumes before the war were the Port of Yuzhny, Mykolaiv Port, Chornomorsk Port, and the Port of Odesa,

1. GENERAL OVERVIEW OF THE INDUSTRY

The exploration of the riches of the World Ocean opens truly colossal, albeit not infinite, opportunities for Ukraine to secure its rightful place among the leading countries in the world. We are, in fact, a maritime state: the area of internal waters reaches 27,000 square kilometers, territorial waters cover about 30,000 square kilometers, and the exclusive economic zone extends to 82,000 nautical miles. The maritime state border stretches for 1,355 kilometers. We have access to the Black and Azov Seas, the Kerch Strait, and through the Bosporus, Dardanelles, and the Sea of Marmara - wherever we desire.



In Ukraine today, the North Black Sea region within the geographical boundaries of the Odesa and Mykolaiv regions is the center of Blue Economy enterprises. For this reason, we can and should take advantage of our historical opportunity to join human civilization in its quest to create conditions for sustainable blue economic development, caring for biodiversity and enhancing ecological security.

The World Ocean, covering over 70% of the Earth's surface and containing 88% of its biomass, has practically become the last reserve food pantry for future generations of Earth's inhabitants, as well as a powerful generator of vital ecosystem services. Moreover, within its depths, we find valuable minerals hidden on the ocean floor and beneath it, as well as chemical elements dissolved in seawater, and recreational attractions and benefits associated with them. As for the Black Sea, it is the largest concentrator of hydrogen sulfide, as 90% of the mentioned natural reservoir is contaminated with water, more or less enriched with this chemical compound.

Let us not forget about the transport and logistics sector, through which 90% of the world's goods produced move from numerous producers to end consumers. This sector also includes shipbuilding, aquaculture and mariculture, offshore wind energy, tidal and wave energy, and recreation. All of this needs to be managed, accounted for, and investment needs to be found, relying on balanced calculations of economic efficiency.

We must acknowledge that until recently, the use of World Ocean resources by humans has been selective and openly predatory, resembling the primitive economy of appropriation characteristic of the primitive era. It is high time to realize the need to replenish resources (especially those on the verge of depletion) and, caring for the future of humanity, start building a sustainable maritime economy, a blue economy of reproduction.

1.1. FISHING AND FISH PROCESSING

In 2018, the Odesa and Mykolaiv regions accounted for 15 and 22 percent, respectively, of the water living resources extracted by domestic fishermen [1]. The main species of marine fish included flounder, mullet, herring, garfish, sea carp, bullhead, and others. Some of them are experiencing overfishing, the impact of adverse anthropogenic factors, violations of fishing rules, and as a result, a decrease in industrial production. This makes it relevant to initiate mariculture projects on the one hand, and to implement programs for the conservation of biodiversity in natural water bodies within internal, territorial, and exclusive economic zone waters on the other.

As a result of russia's military aggression and the imposition of martial law in Ukraine, as of January 1, 2023, the industrial catch of fish and other bioresources in fishery water bodies and on the Ukrainian continental shelf has decreased by more than 109.6 times and amounted to 75.8 tons (in 2021 - 8305 tons). About 80% of users of water bioresources have ceased their economic activities. Industrial activity by Ukrainian economic entities in the Black Sea basin has been suspended (Figure 1).

Due to the above reasons, insurmountable obstacles have arisen for scientific research in the field of fisheries, and significant losses have been suffered in fishing outside the jurisdiction of Ukraine. Although Ukraine still maintains membership and opportunities for expeditionary fishing in the area of responsibility of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) and the Northwest Atlantic Fisheries Organization (NAFO).

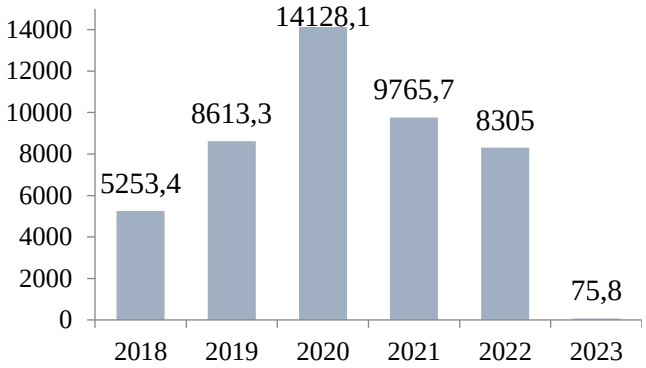
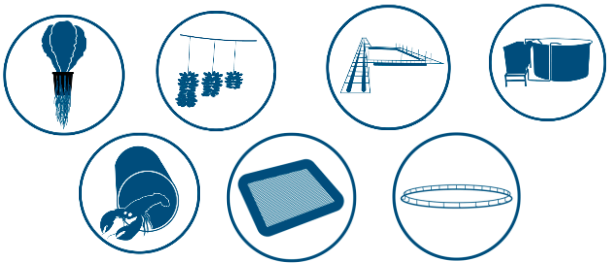


Figure 1. Volumes of bioresource catch in the Ukrainian waters of the Black Sea, tons, as of January 1 of the corresponding year (according to the annual reports of the State Agency for Land Reclamation and Fisheries of Ukraine).

As of August 1, 2022, the losses of Ukrainian fishing entities due to the actions of the state-terrorist amount to almost $40 million [4]. And this applies to all traditional fishing items (Figure 2).



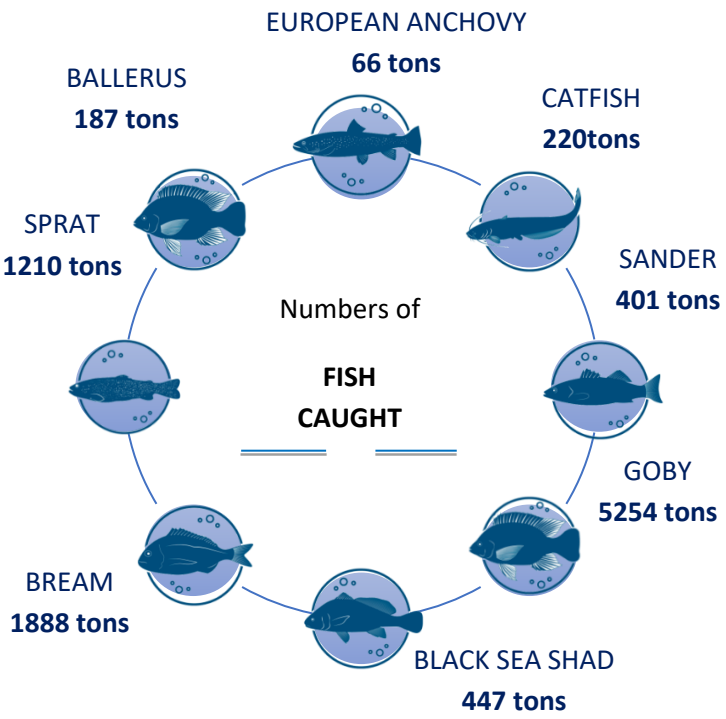


Figure 2. Traditional structure of fish catch by Ukrainian fishermen.

The fishery complex of the Odesa region consists of the Black Sea seaport, six fish processing factories and fish processing plants, 104 fish enterprises of various forms of ownership, seven fish farms, four of which have breeding status.

1.2. AQUACULTURE

Aquaculture opens up broad prospects for the development of the fishery complex in the Odesa and Mykolaiv regions. Their coastal waters are favorable ecosystems for cultivating mollusks (mussels, oysters, scallops), the industrial cultivation of which does not require expenses for artificial feed. From a raft with an area of 16x25 m, with 600 ten-meter collectors suspended, over 4 tons of oyster meat are obtained per year. Since the life of mollusks is associated with water filtration, they also purify it, including from pathogenic bacteria [5]. According to scientists' calculations, one mollusk is capable of purifying up to 100 liters of water per day. In southern Ukraine, it is promising to cultivate euryhaline species of marine fish that live in conditions of moderate and variable salinity and temperature ranges of this zone. These include:

- **mullets** (grey mullet, flathead mullet, leaping mullet) - through artificial reproduction, pasture cultivation in estuaries and lagoons;

- **flatfish** (river flounder - Black Sea flounder, turbot) - possible artificial reproduction, controlled cultivation in basins, recirculation systems;

- **sturgeons** (Russian sturgeon, beluga, sterlet, bester, various sturgeon hybrids) - through artificial reproduction and pasture, commercial cultivation in basins, recirculation systems;

- **pikeperch** - reproduction and pasture cultivation using artificial reefs.

Before the war, there were 33 specialized commercial fish farms and 56 aquaculture entities in the Mykolaiv region. The AQUABATOR project is being implemented in Mykolaiv region - an incubator for launching businesses in the aquaculture sector. It envisages the creation of an ecosystem for its development in southern Ukraine.

The initiators are the Business Support Center, Mykolaiv City Council, and Halytsynivska Village Council as part of the sectoral policy support program.

The total cost of AQUABATOR is 8.9 million UAH. Of these, 5.9 million UAH is state budget funds, and the rest is financial contributions from partners. It is hoped that in the future, aquafarms will also become attractive tourist attractions. Visitors will be taken on tours and treated to freshly made dishes.

The State Institution "Methodological and Technological Center for Aquaculture" is available to beginner investors. Its employees assist in the creation of fish farms, the cultivation of fish in recirculating aquaculture systems, ponds, and hatcheries, as well as the implementation of new technologies and approaches in fish farming. They provide advice on lease agreements, explain the legislation norms in fisheries activities, and share useful international experience.

The Cabinet of Ministers of Ukraine, by its resolution "Some issues of implementing an experimental project on the introduction of auctions for the sale of the right to conclude lease agreements for the use of the water area (water space) of internal sea waters, territorial sea, exclusive (marine) economic zone for the purposes of marine aquaculture through electronic trading" (No. 1191 of October 14, 2022), proposed a transparent and understandable mechanism for businesses to access marine waters for the development of mariculture, which should promote equal competition conditions for all interested economic entities.

The main beneficiaries of this are small and medium-sized entrepreneurs and residents of coastal settlements who will gain new job opportunities. The preservation and expansion of biodiversity in ecosystems is expected to increase their productivity.

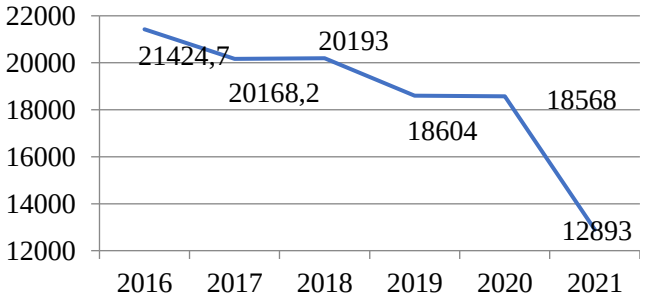


Figure 3. Cultivation of commercial products by aquaculture enterprises in Ukraine, tons (based on annual reports from the State Agency of Water Resources and Fisheries of Ukraine)

Another innovation is the introduction of location tracking for fishing vessels during commercial fishing in the territorial waters of Ukraine and beyond, starting from June 2023. This control measure will help combat illegal fishing, improve the competitive environment in favor of legal businesses, and enhance the effectiveness of water resource conservation.

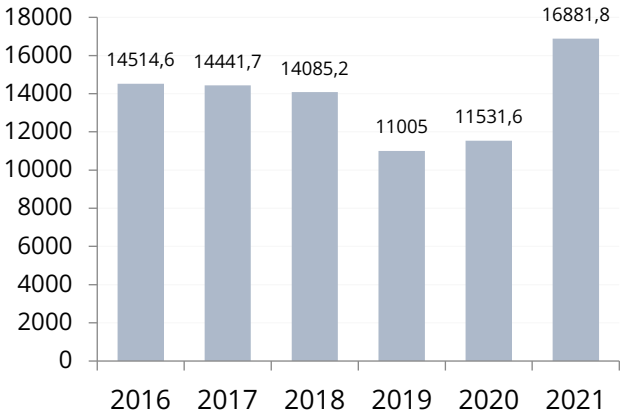


Fig. 4. Catch of commercial products by aquaculture enterprises in Ukraine, t (based on annual reports of the State Agency for Land Reclamation and Fisheries of Ukraine)

1.3. COASTAL AND MARITIME TOURISM

The Black Sea coast of Odesa and Mykolaiv regions has a powerful recreational potential. Among its components, the following varieties deserve special attention:

- Sports and recreational. It is further divided into subsystems: water and underwater recreation;
- Resort and therapeutic. It is based on the mobilization of a range of favorable balneological factors (sea water, air, mineralized waters, and mud) for the restoration of vitality and support of patients' health;
- Cognitive. This involves organizing excursions to architectural structures, historical and cultural monuments, familiarizing with the ethnographic features of the regions, unique natural phenomena, and excavations of ancient civilizations.

The climate of the region is characteristic of coastal areas in the steppe zone. Winter is warm, mild, and with little snow. Summer is dry and hot: in the coastal strip, the water warms up to 26 degrees Celsius. The temperature and humidity of the air, its iodine content, chlorine and bromine salts, will satisfy any recreational visitor.

The therapeutic profile of resorts in Odesa and Odesa region (Karolino-Buhaz, Zatoka, and Sergiyivka) is characterized by the presence of natural therapeutic resources: mineral waters of the Odesa, Kuyalnytsky, and Black Sea deposits; muds of Kuyalnytsky and Khadzhibey estuaries, and lake brines. The sea beaches, natural objects, and complexes contribute to treatment, rehabilitation, and medical recovery through climatic conditions. In 2022, there were 321 sanatoriums and health resorts in the Odesa region, which can accommodate over 40,000 clients.

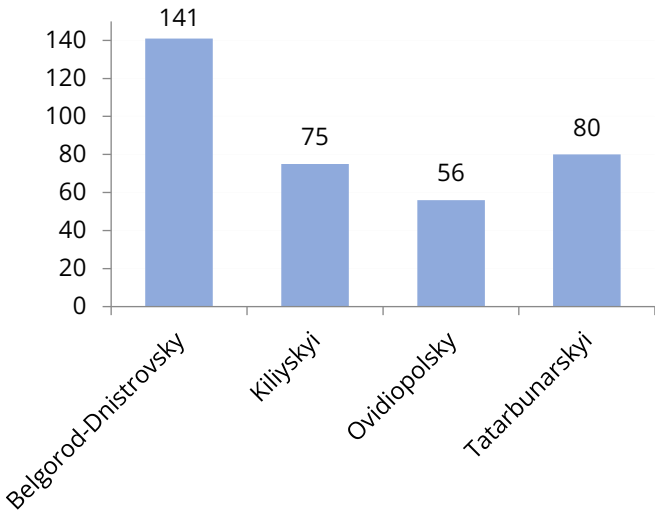


Fig. 5. Districts of the Odesa region with the most extensive network of sanatorium-resort facilities, units

Hundreds of cultural and artistic events are held in Odesa every year, such as the Day of Humor (April 1, Odesa), the International Clown Festival "Comediada" (April, Odesa), knight tournaments and the "Steel League" festival in the Akkerman Fortress (June-August, Bilhorod-Dnistrovskyi), the Odesa International Film Festival (July), the Festival of "Danube Herring" (May, Kiliya), the International Arts Festival at the Odesa Opera (June), the International Youth Tourist and Art Festival "Fresh Wind" (June, Mykolaivka, Bilhorod-Dnistrovskyi district), the "Bessarabian Fair" (August, Tarutino), the International Festival "Odesa Jazz Fest" (September), and the Ethnic Festival "Bessarabian Tantela" (September, Izmail).

The main recreational areas of the Mykolaiv region are also located on the coast of the Black Sea and estuaries. According to the Main Statistics Office, there are 271 resorts in the Mykolaiv region with a capacity of 29,229 places. Among them: hotels - 79 (3,332 places), sanatoriums - 13 (3,273 places), boarding houses - 12 (2,416 places), recreation bases - 167 (19,357 places). The most promising directions for tourism development in the Mykolaiv region are ecological, rural (green), historical and cultural, industrial, youth, and active types of tourism (rafting, kiting, jumping, hiking, sports orientation).

The Law of Ukraine "On Tourism" declares it as one of the priority directions for the development of the economy and culture. The relevant programs developed in this context constitute a complex of interrelated legal, economic, and organizational measures aimed at implementing the constitutional rights of citizens to rest and a healthy lifestyle.

The tourism and resort industry is related to the work of over 50 types of enterprises, contributes to the increase in the employment rate in coastal regions, the preservation and development of their cultural potential, and in terms of its international component, contributes to the harmonization of relations between countries and peoples. According to experts' estimates, the development of the potential of recreational areas, provided they have proper infrastructure (roads, parking lots, beach decoration, artificial reservoirs, water supply and drainage, European level of comfort in temporary accommodations, restaurants, and entertainment facilities for vacationers of different age groups), will allow increasing the number of clients by an average of 4-10 times.

1.4. MARITIME CARGO TRANSPORTATION

The economy of Ukraine depends on the efficient functioning of ports. Approximately 39% of its external trade (by volume) passes through ports, including 90% of the gross export of agricultural

products. Over the past pre-war years, the volume of cargo handling in seaports has been growing (Figure 6).

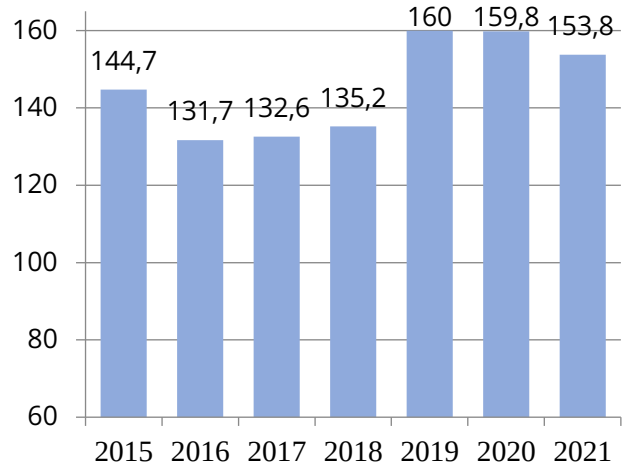


Figure 6. Volume of cargo handling in seaports, million tons (according to the Administration of Seaports of Ukraine)

In 2019, container terminals processed over 1,003.5 thousand TEUs, and the volume of container transportation increased by 18.6%.

The Odesa seaport is one of the largest on the Black Sea. Its 55 berths have a total annual capacity of 51 million tons of various cargoes. Five elevators and three covered storage facilities are designed for the protection and handling of 12 million tons of grain per year. The logistics schemes of maritime transportation also include the ports of Yuzhny, Chernomorsk, Izmail, Bilhorod-Dnistrovskyi, Reni, and Ust-Dunaisky.

There are 34 ports and port terminals located in the Mykolaiv and Mykolaiv region, which make up the structure of the Buzko-Dnipro Sea Transport Hub. The most powerful among them are the Mykolaiv seaport, specialized seaport "Olvia," Ochakiv port, Mykolaiv river port, "NIBULON," and "Mykolaiv specialized port Nika-Tera." Their geographical location, proximity to exporting enterprises, and a developed network of related river, rail, road, and aviation communications contribute to the organization of transit cargo transportation. According to the Administration of Seaports of Ukraine, the growth of cargo handling volumes by Mykolaiv ports in 2018 compared to 2017 was 5.7%. Since the beginning of the war, the Russian naval fleet has paralyzed commercial maritime transportation, and the Danube waterway has become an alternative. The ports of the largest river in Europe have become the main alternative for maritime agro-export, with their capacity reaching 1.5 million tons per month. The cargo turnover of Danube ports for the first 9 months of 2022 amounted to over 11 million tons, which is 3.5 times more than the same period last year.

Another segment of the maritime transportation market is the construction and maintenance of offshore energy facilities. Blue energy is a tool for humanity to get rid of hydrocarbons, the reserves of which on the planet are constantly depleting. In addition, it has the potential for sustainable energy production, which is important in the face of increasing environmental threats and challenges. The implementation of new legislation, the introduction of relevant standards, and the development and implementation of projects contribute to the expansion of capacities in this sector of the energy industry.

2. Business environment in the industry

The enterprises of the Blue Economy are an integral part of the country's economic complex. For this reason, they are affected by a wide range of factors that affect the overall state of the business environment. If we talk about the ease of doing business ranking, which is determined by the World Bank, in 2020 Ukraine ranked 64th out of 190 countries. It was determined by ten key indicators of regulation of entrepreneurial activity. They include the time and cost of complying with the state requirements for registering a new enterprise, its ongoing activities, conducting trade operations, ensuring contract compliance, taxation, and cessation of operations (Table 1).

Table 1. Indicators of regulation of entrepreneurial activity.

Indicators	Value
Opening a business	61
Issuance of construction permits	20
Obtaining electricity	128
Property registration	61
Obtaining a loan	37
Protection of minority investors	45
Payment of taxes	65
Trade across the border	74
Enforcement of contracts	63
Solving the problem of insolvency	146

According to the results of 2022, only over 30% of enterprises in the southern regions completely or partially ceased operations, 26% reduced their work volumes, and only 25% managed to maintain production levels at the previous year's level, with only five percent increasing it. It is evident that the war has significantly impacted business activities, leading to the destruction of capital assets, partial or complete destruction of infrastructure facilities, and the outflow of competent personnel. At the same time, it is necessary to acknowledge the presence of non-military and political factors that, in the opinion of businesses, affect their activity (Figure 7).

Clearly, the problems mentioned can be divided into two groups:

The first group is related to the impact of human factors on business processes. The main issue in this group is not the shortage of competent personnel, which usually concerns business owners regardless of the size and type of activity (19%), or the dishonesty of clients (16%). The more significant problem is the lack of solvent customers (50%). This applies to both the B2B segment (some former clients have ceased operations, while others have relocated their production and reprogrammed their partnership relations based on considerations of economic efficiency in logistics and marketing operations) and the B2C sphere (according to information from the authorized body of the Verkhovna Rada on human rights, 4.9 million citizens of Ukraine have become internally displaced persons, and another 7.9 million have left the country in search of refuge from risks and dangers).

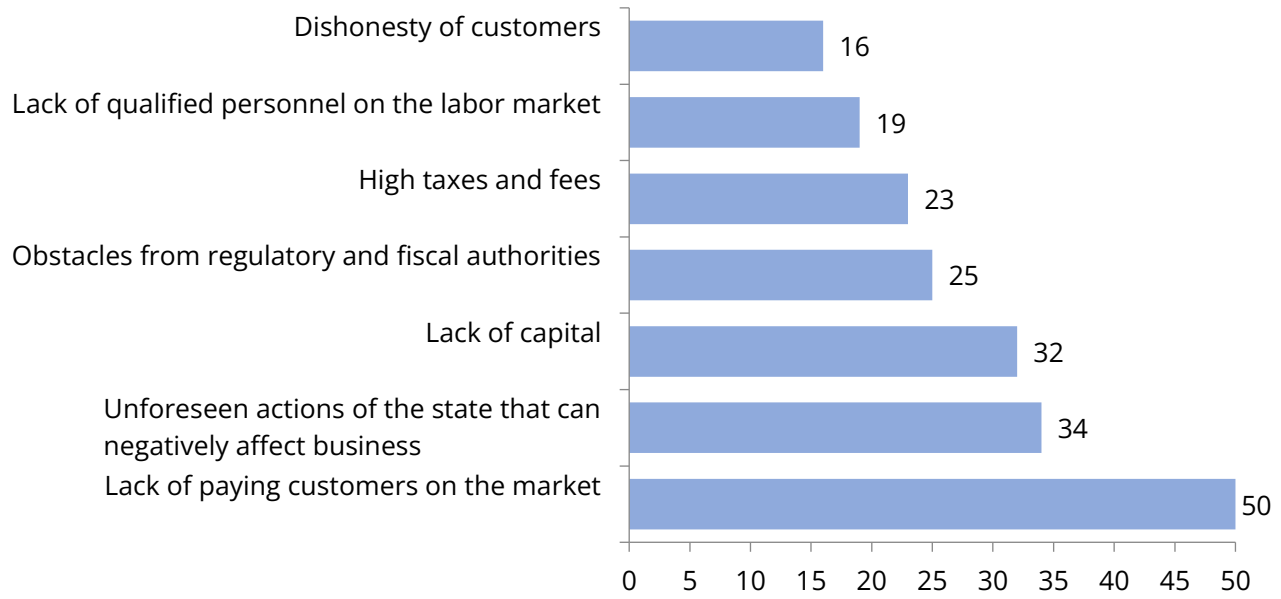


Fig. 7. Key non-military and political problems faced by businesses in Ukraine, as a percentage of respondents.

The second group of problems relates to the relationships between businesses and the legislative and executive authorities. The latter should realize that a strong economy is the foundation of a respected country in the world. The level of sustainable development and competitiveness determines the well-being of the population, national security, and the country's place and role in the global division of labor.

3. Creating conditions for industry development

Research on the natural potential of the Blue Economy, the diversity of enterprises representing its sectors, and the accumulated production and intellectual capital confirm that we can expect an increase in business activity after the end of hostilities in southern Ukraine. However, certain conditions need to be created for this, including:

a) Achieving clarity in state policy as a whole and, in particular, in the regulatory framework for the industry, strategies, and state target programs for the development of its components, outlining priority vectors for scientific, technological, and innovation progress, and organizing the accumulation, systematization, and analysis of reliable information regarding the current state and prospects of further development.

b) Developing a state program for the rational use and protection of water areas and coastal territories, marine bays, and estuaries. Involving a wide range of experts, representatives of government bodies, scientific institutions, higher education institutions, international and public organizations in this matter.

c) Creating an organized, rational in form, and effective in content structure of state management of marine economic activities. This includes the task of restoring coastal and marine ecosystems.

d) Developing and implementing an investment project for the construction of a resort on the Black Sea coast, with the development of the corresponding transport and engineering infrastructure and attracting direct foreign investment.

e) Promoting the implementation of tools and programs for regional economic development (EU Sectoral Program, Black Sea Interregnext 2021-2027 Program, Interregional Innovation Investment Program) to support the sustainable development of mariculture.

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f) Utilizing creative industries for the development of coastal territories and extending the duration of the resort season, as well as developing new forms of tourism based on the ethnic and national diversity of the region.

g) Improving the transport logistics of coastal regions, which will connect recreational settlements with each other and regional centers (Odesa, Mykolaiv), ensuring safe and comfortable local (urban and intercity) passenger transportation.

h) Developing coastal territories based on the following principles:

- Involving territorial communities in the planning and implementation of development projects.
- Compliance with environmental legislation and construction norms during the construction of resort and recreational centers.
- Using spatial planning methods for the development of resort infrastructure and balanced development of other types of marine economic activities.
- Expanding and reconstructing water supply and wastewater treatment facilities in coastal cities, as well as deep-water discharge systems to bring them to the required level.
- Building waste sorting and processing terminals in major recreational centers that can generate income for both owners and local territorial communities.

i) Developing a concept and plan for the implementation of the transaquatorial international project “Blue Ribbon”. Its goal is to create material and organizational-economic conditions for the development of maritime and coastal tourism in the countries of the region through the establishment of regular cruise lines visiting significant Black Sea historical and cultural centers. The implementation

of the project would contribute to the prosperity of small and medium-sized enterprises, the creation of new jobs in the restaurant, hotel, and event businesses, services for small vessels, and would create demand for cruise liners of appropriate passenger capacity, providing orders for continental shipbuilding.

j) Defining the Black Sea coastal area in the new General Scheme of Territorial Planning of Ukraine and conducting functional zoning, including the adjacent marine waters, using the methodology of marine spatial planning.

k) Improving the rules for the development of coastal settlements with special requirements for the accessibility of the coastline, the presence of recreational areas, and the necessary engineering infrastructure.

l) increase the number of nature reserves in the coastal areas of the sea and Black Sea estuaries;

m) initiate mutually beneficial projects of interregional cooperation between coastal territorial communities in the field of sustainable blue development;

n) establish networks of industrial parks focused on stimulating small (medium) blue businesses to apply new technologies and modern management solutions;

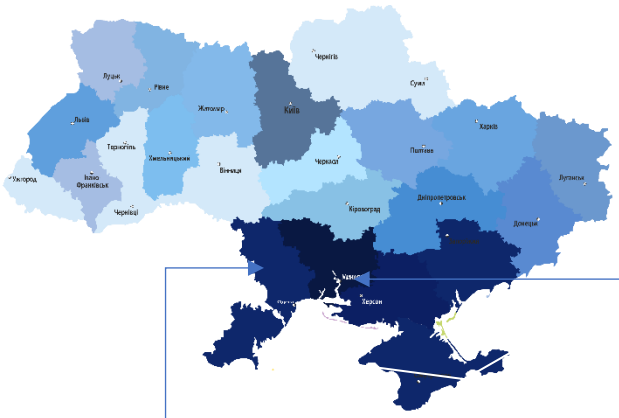
o) create a Center for Maritime Competence to implement advanced digital technologies in maritime economy enterprises and update the knowledge and skills of personnel involved in their work;

t) develop a strategy for the development of fisheries and aquaculture in Ukrainian water bodies, based on the experience of leading European countries.

4. Key information about the Ukrainian Maritime Cluster

4.1. Objective prerequisites for business clustering

The Blue Economy cannot fulfill its mission properly without its main capital component - vessels. It increasingly requires technical structures that can solve new and emerging challenges that arise with the exploration of the World Ocean (both in terms of complexity and the volume of work to be done). These structures should be characterized by maximum economic efficiency during operation and minimize their negative impact on the environment, or even better, operate without any negative impact.



Shipbuilding companies in the Odesa region:

1. State Enterprise Ship Repair Yard "Ukraine"
2. PJSC "Illichivsk Ship Repair Plant" (ISRZ)
3. SBU "Kiliya Shipbuilding & Repair Yard"
4. PJSC "Danube Ship Repair"
5. LLC "Ship Repair Enterprise "Danube Ship Service"

For this reason, we cannot overlook shipbuilding. Over the years of independence, the number of shipbuilding enterprises in the southern industrial location has almost doubled. And this happened thanks to the initiative of private capital. Investors and management, of course, welcomed government incentives. However, in conditions when they are delayed, they seek their own ways for business development.

The quantity of constructed vessels was significantly affected by the military-political confrontation between Ukraine and Russia. In 2014, production volumes decreased by 33.3% compared to 2010. However, by 2020, the number of constructed vessels doubled compared to the first year of the war (2014). Almost 30% of the total 176 structures are accounted for by the Mykolaiv shipyard "NIBULON" (50 vessels).

Shipbuilding companies in the Mykolaiv region:

1. State Enterprise "Mykolaiv Shipbuilding Plant"
2. LLC SHIPYARD OCEAN
3. NIBULON shipbuilding and repair yard
4. LLC "Smart Maritime Group"
5. LLC "Artel Marine"
6. "Black Sea Yachts Shipyard" LLC
7. LLC "Shipbuilding and Ship Repair Company "Mykolaiv Shipyard"
8. LLC "Magistral-Yug"
9. LLC "USK Service"

The structure of the order portfolio has undergone a radical change. It now includes military projects, the construction of which began in cooperation with the State Defense Consortium of the Republic of Turkey (corvettes) and the United Kingdom (missile boats) by February 25, 2022. As for civilian shipbuilding, it is dominated by individual production. This encourages the use of modular technologies and efficient supply chain management. These enable contracts to be executed quickly, with high quality and competitive cost-effectiveness.

A distinctive feature of pre-war Ukraine is the dynamic development of ship repair and vessel conversion. This can be explained by:

a) the increase in the global fleet, which leads to a demand for vessel maintenance.

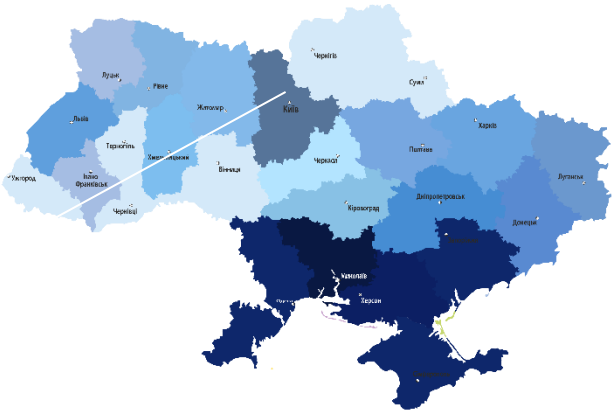
b) The recent engineering structures being created are extremely complex. Their interiors are filled not only with mechanical components but also with numerous electronic devices and systems. In order for all of them to perform their functions properly, well-planned and highly professional service is required.

c) The high construction cost of vessels prompts shipowners to seek acceptable strategies for extending the lifecycle of their ships.

d) The increasing demand has a favorable impact on the prices of corresponding services, and shipyards do not hide their interest in orders. If we consider the number of completed orders, it becomes evident that their volumes are significantly higher than in shipbuilding. Ship repair was less affected in 2014 and recovered more quickly. In 2019, the number of contracts almost reached the level of 2010.

Engineering organizations:

1. State Research & Design Shipbuilding Centre (SRDSC)
2. LLC “Marine Design Engineering Mykolayiv” (MDEM)
3. LLC “C-Job Nikolayev”
4. LLC “Project Design Bureau “ProLine”
5. LLC PKB “Zaliv Ship Design”
6. LLC PKB “Asaba Design Center”
7. PP PKB “Torola Design Group”
8. PJSC “Chornomorsudnoproject”
9. LLC “Design Group ALA”
10. LLC “POSS Torola”



Engineering and research organizations:

1. LLC “Marine Engineering Bureau” (MEB)
2. LLC KB “Grand Engineering”
3. ISR SHTORM LLC

It cannot be overlooked that as a result of repairs, certain technical characteristics, and even the purpose of vessels, may undergo changes. The shape of the hull and superstructures may also be altered, new main or auxiliary engines may be added, and the interior decoration of the premises may be redesigned and modified. Such works require careful development of design projects. We see economic reasons for the growing market demand for another type of maritime business - naval engineering.

Without exaggeration, it can be said that it has experienced real prosperity. There are 13 design bureaus operating in Mykolaiv and Odesa. The majority of operating enterprises represent a new generation of investors, management, and engineers. It is not so much about the duration of their presence in the market, but about their mindset and corresponding actions. This means, firstly, that thanks to their enthusiasm and capital, an industry of providing intellectual services has been created, which can only be compared to the IT business. They have discovered and implemented a new development strategy based on the standards of the digital economy.

Secondly, engineering companies are 100%classified as small and medium-sized enterprises. This means that they are characterized by:

- Flexibility and ability to maneuver quickly in response to changes occurring in the environment (customer requirements, classification societies, technological shifts in shipbuilding, updates to engineering software and technical tools).
- The ability to play the role of an experimental ring in the value creation chain.
- An acceptable cost of the work performed, not burdened by high overhead costs typical of organizations with extensive bureaucratic management structures. As a result, the overall cost of projects is reduced, and their competitive ability is increased.

These advantages are not overlooked by customers, who have a wide range of various high-quality intellectual services at their disposal.

Table 2. Ship engineering bureau services

Name	Specialization
State Research & Design Shipbuilding Centre (SRDSC)	Combat surface ships and boats, auxiliary vessels and special floating structures
PJSC "Chornomorsudoproekt"	Vessels of all types and purposes, their retrofitting and modernization
LLC "Marine Design Engineering Mykolayiv "	Vessels of all types and purposes
LLC "Design Group ALA"	Yachts, special and fishing small-tonnage vessels
LLC "ProLine Design Bureau"	Megayachts, recreational and executive transport vessels
LLC "POSS Torola"	Working documentation for the construction of hulls, completion and outfitting of vessels, pipelines, plasma technological programs
LLC "C-Job Nikolayev"	Vessels of all types and purposes
LLC "Zaliv Ship Design"	Vessels of all types and purposes
LLC "Asaba Design Center"	Vessels of all types and purposes, combat surface ships

One of the brightest examples is the company "Marine Design Engineering Mykolayiv" (MDEM).

Table 3. Characteristics of effective MDEM management

Indicator	**Unit**	**Unit**						
Number of staff								
Total,	Person	42	72	103	137	155	199	204*
Out of them	Person							
design engineers		34	59	81	102	110	138	153
Growth index								
Total staff	%	100	171	245	326	369	474	486
design engineers	%	100	174	238	300	324	406	450
number of concluded contracts	%	100	30	33	31	33	44	37
sales revenue	%	100	733	1253	2075	3347	4972	4996

The main consumer of its services is the "Damen international shipyard group". With the increasing trust from Dutch partners, the company's portfolio gradually expanded to include transportation and offshore vessels, pontoons, barges, floating cranes, mega yachts, high-speed ferries, pilot and multi-purpose boats, and tugs. In response to the rapid growth in demand, MDEM management developed a staffing strategy, the effectiveness of which has been confirmed by practice. It is worth noting that the growth rate of the total workforce has been dominating over the number of design engineers since 2012. This trend continued even during the war, as new specialized departments emerged and gained strength in the field of digital marketing services and special engineering calculations. The company has become multi-divisional. The increase in workload has led to an increase in job opportunities

4.2. CLUSTER PROSPECTS FOR SHIPBUILDING.

Creating a business from scratch is a special value for each of the founders. That is why they take care of it, protect it from various dangers, and strive for growth and prosperity. This attitude is natural and does not depend on the subject of economic activity, its scale, or organizational and legal form. Private owners of shipbuilding companies and engineering bureaus of the new wave are no exception. That is why they decided to follow the constructive experience of their foreign colleagues. Moreover, in the field we are studying, clustering has been raised to the level of state recognition and support. And on the European continent, maritime clusters have already formed their own network.

The initiative to create the "Ukrainian Maritime Cluster" was announced in 2019. Since then, work has been done to understand the potential circle of participants, the composition of the management bodies, and key planned decisions that lay the groundwork for further activities. After a year, all legal formalities were resolved. The maritime cluster became a reality de jure. The vision for it is to build economic relations between shipbuilding and other players in the maritime industry, global and national regulatory bodies, developers of state policies, and organizations responsible for its implementation.

It is obvious that the founders took into account global practice. They bridged the gap between sectoral cluster structures and opened up prospects for their integration into the Blue Economy system. This is true because shipbuilding, which is the focus here, is a business that creates means of production for a whole range of other activities: offshore marine energy, fishing, mariculture, exploration and extraction of minerals, and shipping. The success of each and all of them depends on how well they understand each other. In addition, shipbuilding is a component of a complex supply chain and therefore fuels the business activity of related economic sectors (metallurgy, machinery and instrument engineering).

This interpretation of the vision is reinforced by the mission formula of the cluster. It contributes to the development of the Ukrainian maritime economy through the consolidation of efforts of the enterprises that form it. The current agenda includes the issue of sustainable development of a climate-neutral, circular, and productive Blue Economy. Its solution is impossible without decarbonization of maritime transport, defining emission control zones, redefining the role of ports, and preserving and multiplying natural capital. Therefore, the unity of efforts of all stakeholders is not only desirable but also absolutely necessary.

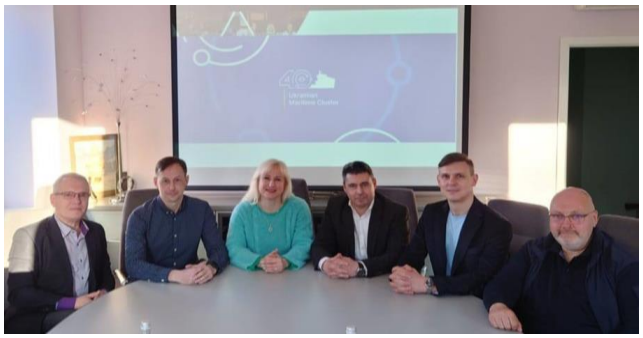
And the shipbuilding industry of Mykolaiv and Odesa regions should become a role model for others. This directly follows from the analysis of the first 19 cluster participants. Shipbuilding and ship repair companies account for 32% of them. Ship engineering companies account for 16%. Business associations, business support centers, educational

institutions, and the administration of the Mykolaiv territorial community account for 15%. And what attracts special attention is related businesses, which make up 37%. The idea turned out to be captivating, attractive, promising, and filled with optimism. It has found supporters who associate their future with the prospects of shipbuilding that are opening up step by step.

The cluster administration takes care of the implementation of collective expectations. Its structure and quantitative composition are based on the principles of reasonable sufficiency. Currently, there are four employees on staff, whose work is coordinated by the executive director. Olena Zhukova, the head of the engineering company "MDEM", was unanimously chosen for this position. Given the moderate size of entrance and membership fees and the amount of expenses for financing planned events, the staff's activities fall under the category of "volunteer work".

The effectiveness of top managers and the quality of their subordinates' work are monitored by the Supervisory Board under the leadership of Artem Vashchylenko, the head of the Expert and Public Council of the Executive Committee of the Mykolaiv City Council. The board is elected by the general assembly of authorized representatives of participating enterprises. This is precisely the case when individuals with impeccable reputations are involved in the management bodies, whose mere presence, thanks to their recognized virtues, enthusiasm, and constructive initiatives, leaves a positive impression on entrepreneurs, government officials, philanthropists, and the wider public, including the media. The experience, knowledge, and skills of each individual are a guarantee of the growth of the competitiveness of cluster participants. There is no need to look for better motivation for them.

To increase the level of substantiation of important strategic decisions, several committees have been created: "Shipbuilding and Ship Repair", "Military Shipbuilding", "R&D and Education", "Marine Equipment and IT". In the near future, another committee, "Ports and Shipping", was expected to be established. However, critical infrastructure facilities, including ports, are currently under intense shelling.



From the experience of our foreign partners, it is known that a cluster looks attractive when participating firms enhance their competitiveness through the emergence of a more favorable business environment. To achieve this, it is necessary to improve the competence of personnel, gain access to important elements of infrastructure and finance (including foreign investments and grants), and maintain a proper level of demand for

their products. Recognizing this, the administration has formulated a number of value propositions for current and potential cluster participants:

1. Use of shared assets, including websites, development funds, promotion, stands, and exhibition space. It is expected that in this way, all interested parties will save their own money and proactively achieve their desired business goals.
2. Exchange of market analytics and client databases to facilitate production and innovation cooperation within the country and beyond.
3. Accounting and segmentation of value creation chains and development of competitive strategies that align the resources of manufacturers with market needs.
4. Fundraising and innovation brokerage to find sources of preferential financing and grant support for development projects (business process improvement, technology renewal, innovation support, knowledge and skills enhancement of personnel).
5. Dissemination of information about the market positioning of cluster participants, joint and individual PR to improve their image and reputation, and search for partners and clients.
6. Integration and leadership in local high-tech development programs through participation in the creation of industrial and techno parks, accelerators for relevant start-ups, and Industry 4.0 centers.

The application of the "Now-How-Wow Matrix" technology during the strategic sessions allowed for the identification of the main directions of the cluster's work. Among them are: presenting the shipbuilding industry on the international arena, overcoming the shortage of skilled personnel, developing innovative infrastructure (especially in the field of digital technologies), and lobbying the interests of the industry in the government legislative and executive bodies. Each of these directions is further specified with detailed annual plans, approved and supported by available sources of funding. All measures are prioritized based on the ratio of estimated efforts and the effect that can be achieved.

Today, this promising project has been put on hold. The war (a real and relentless one) has left its mark. At the same time, we observe that the business, especially the engineering sector, continues its activities despite incredible organizational complications and personal tragedies of employees. This means preserving, above all, the intellectual potential for the future.

Clusters in European countries also have access to assistance from private funds or donations from those who show solidarity with their

aspirations. They receive significant support from their governments and EU funds: grants, technical support, export consultations, educational programs, monitoring and evaluation of activities, infrastructure development, start-up funding, support for environmental efficiency, establishment of new cluster management organizations, co-financing of business projects based on public-private partnerships, and so on.

This is not "philanthropy" by officials at the expense of taxpayers. It is about motivating development directions that are considered the most promising: innovation, research and development, balancing regional industrial systems, accelerating high-tech or export-oriented businesses, enhancing the chances of small and medium-sized enterprises, improving key competencies, and modernizing human capital. Of course, the respective priorities vary from country to country, region to region, and the period of time being considered.

We hope to witness something similar in our country. In the meantime, we continue to work, relying on our own strengths and intelligence. The activities of the Ukrainian Maritime Cluster serve as evidence that our efforts are not in vain:

• the speeches of its speakers at the Blue Summit event "Towards a Sustainable Economy," which took place as part of the European Maritime Day program in Ukraine. The speeches outlined the vision for the integration of our country into sea economy development projects.

• participation in the brokerage event "Joint Entrepreneurial Opportunities for Romanian and Ukrainian Companies to Stimulate the Blue Economy in Maritime Transport" (August 18, 2022), organized by the Chamber of Commerce, Industry, Agriculture, and Navigation of Constanta (Romania).

• work of experts and specialists in the cluster on the Development Concept for Rivers and Small-Scale Shipping in Mykolaiv for 2019-2030 and the corresponding Program for 2022-23.

• organization of the Blue Summit on the topic "Towards a Sustainable Maritime Economy. Strategic Priorities for Ukraine's Economic Recovery" (May 25, 2023) with the support of the EU Delegation to Ukraine and as part of the European Maritime Days 2023.

• involvement as associate members in the work of The Shipyards' & Maritime Equipment Association of Europe - an influential organization that brings together shipbuilding companies, equipment manufacturers, port operators, and other players in the maritime industry in Europe.

• presentation of the achievements of the Military-Maritime Subcluster of the State Concern "Ukroboronprom" (NVK "KLIVER" LLC, "Zorya" - "Mashproekt" SC, and "Research and Design Shipbuilding Center" SC) to hundreds of participants at the world's largest and most authoritative naval exhibition, Euronaval, held on October 18-21, 2022, in Paris-Le Bourget (France).

• conducting research within 4BIZ - "Boosting the Blue Economy in the Black Sea Region by Initiating Business Collaboration Framework in the Field of Fisheries and Aquaculture, Coastal and Maritime Tourism, and Maritime Transport". The cooperation framework brings together interested parties in the blue economy in the EU and Black Sea countries that are not yet its members. The project aims to meet the needs of enhancing local potential to stimulate innovation, digitalization, and investment in the Black Sea blue economy.

This list of important and beneficial activities could be continued.

We suggest doing it together!

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