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SHIPBUILDING OF SOUTHERN UKRAINE: FROM STATE MONOPOLY TO CLUSTER INTEGRATION

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Abstract. The *purpose of this article* is to determine the prospects of Ukrainian shipbuilding, based on a review of its historical development. Methodology. In this study, the authors used a mix of methods for collecting, systematising and processing information. Primary data was collected through a review of thematic publications and research conducted by predecessors. Retrospective analysis was used to identify trends in the historical development of the shipbuilding sector of the domestic economy. Statistical analysis was used to determine its current state and foreseeable future. *Results.* Since Porter's introduction of the cluster theory, the Ukrainian shipbuilding business has failed to take advantage of the benefits it has offered. It has been reckless in building cluster potential as a tool for local economic development and community (hromada) management. While most shipbuilding and related enterprises are concentrated in the areas limited by the administrative boundaries of the country's Black Sea regions. Pessimists insist that the chances of success have been lost completely and irrevocably. The authors, on the other hand, based on a generalisation of current practice, observe the Phoenix effect. The authors illustrate it empirically. In particular, on the example of the Ukrainian Maritime Cluster (UMC). *Practical implications.* The first part of the article explores the former power of Ukrainian shipyards. The second part discusses the constructive initiatives of the modern shipbuilding business. The third part highlights the initiative to create the UMC. *Value / Originality*. This paper adds to the existing understanding and provides empirical evidence of the strong and untapped potential of the country's shipbuilding cluster. It also focuses on its attractiveness for cooperation with foreign investors after the onset of peace. The originality of this study lies in the holistic study of shipbuilding practice in the context of development. The authors are optimistic despite the war and the tragic consequences that accompany it.

Keywords: shipbuilding, ship repair, ship engineering, cluster, maritime cluster, small and medium business, Ukraine.

JEL Classification: O25, O38, O57, R11

1. Introduction

De jure, Ukraine is a relatively young country, situated in the eastern part of the European continent. This year marks the 33rd anniversary of its independence. The country's name has recently been a prominent feature of media coverage, featuring in statements by politicians and in scholarly publications. The general public associates the term with a number of significant events and issues. These include the full-scale invasion of Russian troops, the annexation of part of the sovereign state by the northern neighbour (Pisciotta, 2020), the Chernobyl disaster (Fedii, 2020), and corruption among civil servants (Rice, et al., 2020). A smaller proportion of residents in Western countries are aware of the involvement of Ukrainian enterprises in international space programmes (Sazonets, Valiullina, 2017; Lee, 2008). It is not uncommon for individuals to observe the take-off and landing of "MRIYA", the largest aircraft in human history (Smith, 2015). Moreover, only a small proportion of the population has any knowledge of Ukrainian shipbuilding.

The proposed statement is not surprising, as most of the giant factories that have been the subject of national pride in the past have failed to adapt to the conditions of a market economy with its characteristic competition. Their management, fascinated by foreign practices (Mathea, et al., 2003), has long hoped for government support. Unfortunately, this did not happen.

The current generation of entrepreneurs has exhibited a distinct behavioural pattern. These entrepreneurs

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combined an insatiable appetite for shipbuilding, first-hand experience of foreign shipyards and a novel vision of economic relations, which gained traction. This led to the establishment of new businesses, including the acquisition of the assets of enterprises that were being sold. Recently, those with the greatest foresight have recognised the need to integrate. Their objective is to mobilise the accumulated potential, reinforce competitive positions within the country and abroad. To this end, they have created the Maritime Cluster.

The authors of this study have set themselves the following goals:
– First, to look at the genesis of Ukrainian shipbuilding through the prism of retrospective analysis of events.
– Second, to find out how the driving forces and trends of its development have changed over time.
– Third, to determine the chances of initiators of new business projects to find available market niches, gain a foothold in them and launch further expansionary activities.

2. Past and Reflections

The former greatness of Ukrainian shipbuilding has always been based on numerous government orders. The lion's share of them was for military products. This was also the case in 1790, when the first South Ukrainian shipyard built the frigate Sviatyi Mykolai, equipped with 44 cannons. It was a great power at the time. It was the same in the days of the former Soviet Union. At that time, four enterprises in Kherson and Mykolaiv were already fulfilling exclusively state orders for warships and commercial vessels. Other requests simply did not exist in a centrally planned economy. The state ordered, owned, and managed.

In the more than 230 years since its launch, many unfavourable events have taken place. The Crimean War (1853-1856), the Russo-Japanese War (1904-1905), the Civil War (1918-1921), and the Second World War (1939-1945). Ukraine lived through these hard times as part of the Russian Empire and the Soviet Union. Now there is the annexation of Crimea (2014), which led to the loss of the shipbuilding cluster on the peninsula. In particular, Zaliv Shipbuilding Yard, Kerch Shipyard, More Shipyard, Joint-Stock Company "Sudokompozit Design and Technological Bureau", Sevastopol Shipyard, Ship Repair Plant “Pivdennyi". The full-scale invasion of the Russian army in February 2022 and the blockade of the northern Black Sea is the latest example in this series. As a result, sometimes for years and sometimes for decades, shipyards' production activities were slowed down or even suspended. But this did not prevent them from recovering again and again, overcoming obstacles and adversity. The Phoenix effect was making itself felt.

Before and after the fall of the communist regime, shipyards had different organisational and legal forms and were not formed solely on the basis of state investment. For example, Morskyi (1896-1919) was a joint-stock company. Dividends on its shares were paid to Belgian, French and Russian owners. Opened in the middle of the last century, the state-owned "Ocean" shipyard was corporatised in 1994. Since then, its activities have been controlled by the Damen Shipyards Group (Netherlands), the Aker Group (Norway) and the Russian investment fund "FLC West". It is now owned by Ukrainian businessmen. It uses one of the largest dry docks in Europe. It is 355 metres long, 60 metres wide and 17 metres deep. These dimensions make it possible to build Panamax, Aframax and Suez-Max vessels.

The nomenclature of ships once built in Ukrainian shipyards could form the basis for the classification in the academic textbook (Figure 1). Obviously, this far from exhaustive list met the needs of every customer: military, commercial cargo and passenger carriers, fishermen-industrialists. The scale of the production programme can be gauged by reference to the construction of a single production line for the manufacture of large freezer trawlers at the Black Sea Shipyard. Eight ships of this type departed annually. In order to have a basis for a comparative assessment, consider the statement of the Administrator of the Maritime Administration of the US Department of Transportation: "The five largest commercial shipyards in the United States are building a limited number of large cargo vessels for domestic use, averaging five such vessels per year over the past five years." (Buzby, 2019).

Tens of thousands of employees were involved in implementing the ambitious plans. In its heyday, the Black Sea Shipyard employed about 25,000 people, Mykolaiv Shipyard 13,000, and Ocean Shipyard 12,000 (Shipbuilding industry of Ukraine, 2015). The companies used the funds to build housing for them, run kindergartens, hospitals and recreation centres. Future welders, assemblers and other workers acquired knowledge and skills at corporate vocational training centres. In 1967, a branch of the Mykolaiv Admiral Makarov Shipbuilding Institute was opened in Kherson with the financial support of a local shipbuilding company. It is still in operation. What happened after the collapse of the USSR?

First, the huge domestic market with a guaranteed five-year order book collapsed. It used to be updated annually, but only upwards.

Second, along with the end of the Cold War, military shipbuilding programmes were curtailed.

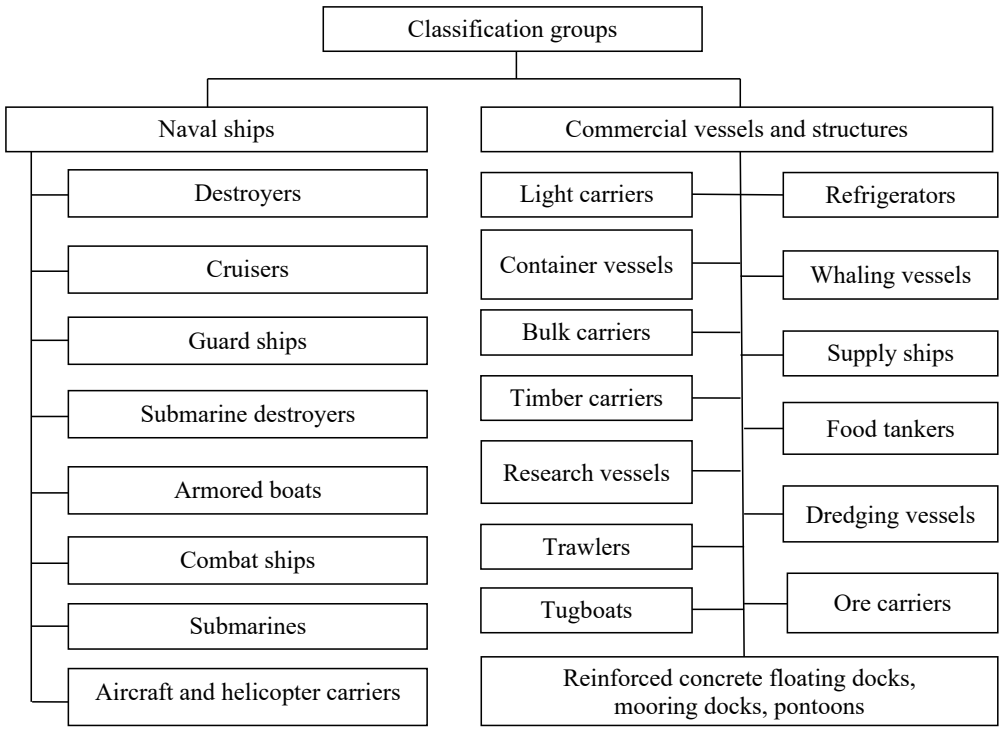

Figure 1. Some types of vessels built at Ukrainian shipyards

Source: compiled by the authors on the basis of information from the official websites of Mykolaiv and Kherson shipbuilding enterprises

Third, the management of the shipbuilding giants was completely unprepared to work in international markets with their fierce competition.

Fourth, the burden of maintaining a corporate social sphere proved to be too onerous. Socialism in the Soviet sense became a historical fact.

Fifth, the state showed complete indifference to the fate of shipbuilding. Its leaders lacked wisdom, experience and foresight.

The above factors led to the gradual and irreversible collapse of the giant factories. The latest event in this series occurred in mid-2021. The court declared the Black Sea Shipyard bankrupt. Many analysts have pointed out that Ukrainian shipbuilding has ceased to exist and it is time to start its revival.

3. Ukrainian Shipbuilding has Prospects

Those who say that shipbuilding in Ukraine has declined are mostly those who live in the memories of past greatness. Apparently, they are not familiar with the events that took place in the country and in the world in the pre-war period. In a broader context, the authors had the opportunity to express their own opinion on this issue (Parsyak, 2018). Accordingly, this study will concentrate on elements that are pertinent to the subject matter of this publication. It is evident that the crisis is a typical phenomenon in the field of shipbuilding across all countries, without exception. This is also the case for those countries with the most powerful economies.

Since the passage of this cabotage law a century ago (1920), the arguably exogenous growth of foreign competition has led to the closure of most US shipyards and a decline in the number of ships built in America (Olney, 2020). Ukraine's shipbuilding industry was once a bastion of American manufacturing, but decades of neglect, ambivalence towards predatory foreign markets, and sequestration have left it running on fumes. If the holes aren't patched now, it won't just be the industry that drowns. It could become a threat to economic and national security, as people will not be able to protect the world's sea lanes – the arteries of trade and veins of national defence (Navarro, 2020).

The COVID-19 outbreak has come as an unfortunate surprise to shipyards in the European Union. Production has been reduced or halted, supply chain activities have been disrupted, the workforce is in a state of temporary unemployment, and many companies are facing serious liquidity problems or need bank loans. In addition, orders for new shipbuilding or ship repairs and refits are being delayed, declared force majeure or cancelled as all shipowners, including cruise and ferry operators, are facing serious difficulties. These economic consequences will last much longer than for many other sectors due to the nature of the sector, and are superimposed on the existing severe competitive

distortions from Asia (Strategic maritime technology industry in urgentneed for specific EU measures, 2020).

It can be reasonably deduced that the periodic shifts in economic circumstances that are characteristic of challenging market environments and the emergence of new participants in value chains are a natural phenomenon. It is sufficient to cite the transformations occurring in shipbuilding as a result of Industry 5.0 innovations. Nevertheless, consumers are invariably drawn to those who are able to impress the participants in the marketing process with the most compelling product offer, one that is balanced in terms of quality and price, and which secures their support in the form of contracted orders. Producers who fall into this category include representatives of the new generation of the Ukrainian shipbuilding industry (Table 1).

As can be seen, the number of shipbuilding companies in the southern industrial district has almost doubled since independence. And this happened thanks to the initiative of private capital. Investors and management would, of course, welcome state motivation. But in an environment where it keeps them waiting, they are looking for their own ways to develop their business.

The occurrences that have transpired have irrefutably validated the conviction that the state has demonstrably failed to demonstrate efficacy as a dominant force in the contemporary economic milieu. At present, only two shipyards remain under state control. Three of them are newly created. Two other state-owned enterprises were transformed into private ones. Thus, the conclusion is in: Ukrainian shipbuilding is a reality. But it has become different. Consider the features that are now inherent in it. First, the scale of shipbuilding has decreased (Table 2).

The military-political confrontation between Ukraine and Russia had a markedly detrimental impact on the region. In 2014, production volumes exhibited a decline of 33.3% in comparison to the 2010 baseline. In particular, this was due to the seizure of production facilities located in the territory of Crimea that had been annexed by Russia. Nevertheless, the "Phoenix" effect is once again evident. In 2020, the number of ships constructed reached double the figure recorded in the first year of the war (2014). Approximately 30% of the total 176 constructions are attributable to the Mykolaiv Shipyard "Nibulon" (50 vessels). Even after the full-scale invasion of enemy forces in 2022, aluminium processing began here to build the first of fifteen minesweepers. They will be used to ensure the safety of inland waterways.

The structure of the order book has changed radically from what is shown in Figure 2. Please note that there is not a single warship in it. This has been the case for all the years of independence. The maritime country neglected its security, naively relying on the promises of the Budapest Memorandum signatories. In 1994, Ukraine joined the Treaty on the Non-Proliferation of Nuclear Weapons, eliminating its missile arsenal in exchange for guarantees of inviolability of its borders from the United States, Britain and Russia.

Table 1
Shipbuilding companies in Mykolaiv and Kherson oblasts of Ukraine*

Name	Origin	Organisational form	Number of employees, people
Mykolaiv Oblast			
Nibulon	N	LLC	350
Mykolayiv Shipyard	SE	SE	756
Ocean Shipyard	NPO	LLC	700
Mykolaiv Shipyard Company "Mykolaivska verf"	N	LLC	429
Southern Ship Repair Company	N	LLC	31
Kherson Oblast			
Pallada Shipyard	SE	PSC	422
Smart Maritime Group	NPO	LLC	484

* Excluding small enterprises specialising in small-tonnage shipbuilding (boats, yachts, boats up to 24 m long).

Remark: N – newly founded; SE – state enterprise; NPO – new private owner.

Source: summarized by the authors according to Catalogue of Ukrainian enterprises (2024), official websites of enterprises and other sources.

Table 2
Shipbuilding in Ukraine, units

Indicator	Year							2010-2020
	2010	2012	2014	2016	2018	2019	2020	
Built	27	22	9	13	13	14	18	197
Including exports	4	3	1	2	1	2	2	26
Export share, %	14,8	13,6	11,1	15,4	7,7	14,3	11,1	13,2

Source: calculated by the authors according to (Overview of the maritime industry of Ukraine, 2020; Grigorenko, 2021)

But every cloud has a silver lining. In 2020, OCEA, together with the Ocean Shipyard, signed a memorandum with the State Defence Holding of the Republic of Turkey on the special construction of corvettes for the Ukrainian Navy.

One year later, a memorandum on maritime partnership was signed between a consortium of UK industry and the Ukrainian Navy. The parties reached an agreement regarding the joint engineering and shipbuilding of eight missile boats. Furthermore, the document outlines plans for the reconstruction of Ukrainian shipbuilding enterprises and the construction of two naval bases. With the support of the aforementioned partners, it was possible to implement measures to protect against hostile in cursions into inland and territorial waters in the Black and Azov Seas. It seems reasonable to posit that it will be possible to achieve this objective, but only after the victory has been secured. In the existing global order book, it is notable that there are non-self-propelled structures, specifically barges. Approximately 25% of the book is dedicated to the discussion of tugs. The rest were built in the amount of one or two vessels. And this is the next feature of the order book. Large series are a thing of the past. Today, one-off production dominates. This encourages the use of modular technologies and rational supply chain management. They allow contracts to be fulfilled quickly, efficiently and at a competitive cost. In an effort to achieve the latter goal, the shipyards have been transformed into one-stop shops with a wide range of related businesses (engineering, foundry, painting and even furniture production). Their specialisation is metal processing, hull construction and fitting out with equipment that is appropriate for the purpose of the vessel. Everything else is outsourced and purchased from contractors. Including foreign ones.

Another feature of Ukraine today is the dynamic development of ship repair and conversion (Figure 3).

A comparison of the number of executed orders with the volume of shipbuilding demonstrates that the former is an order of magnitude greater. The ship repair industry experienced a significantly lesser decline in 2014 and demonstrated a more rapid recovery. In 2019, the number of contracts approached the level recorded in 2010. In 2020, the maritime Smart Maritime Group was the only entity to improve more than fifty ships. Two dry cargo vessels, Gelius 1 and Dremora 2, exhibited an increase in their deadweight tonnage (45% and 38%, respectively) due to the incorporation of a cylindrical insert. Furthermore, they have been converted into double-holds (Smart Maritime Group, 2021).

The authors sees this as a timely response to changing market conditions. As the global fleet grows, the need for service is logically increasing. Moreover, modern ships are heavily equipped with electronic devices, systems and equipment that should create comfortable conditions for crews, passengers and cargo. All this equipment requires careful maintenance. Like any other machinery, ships or parts of their global system fail from time to time. Once again, repairs are necessary. It should be noted that ship owners tend to favour the longest possible period of efficient operation of their vessels. Therefore, they seek assistance from experts in their respective fields. This is the genesis of companies that have identified ship repair as their core competency. One such example is

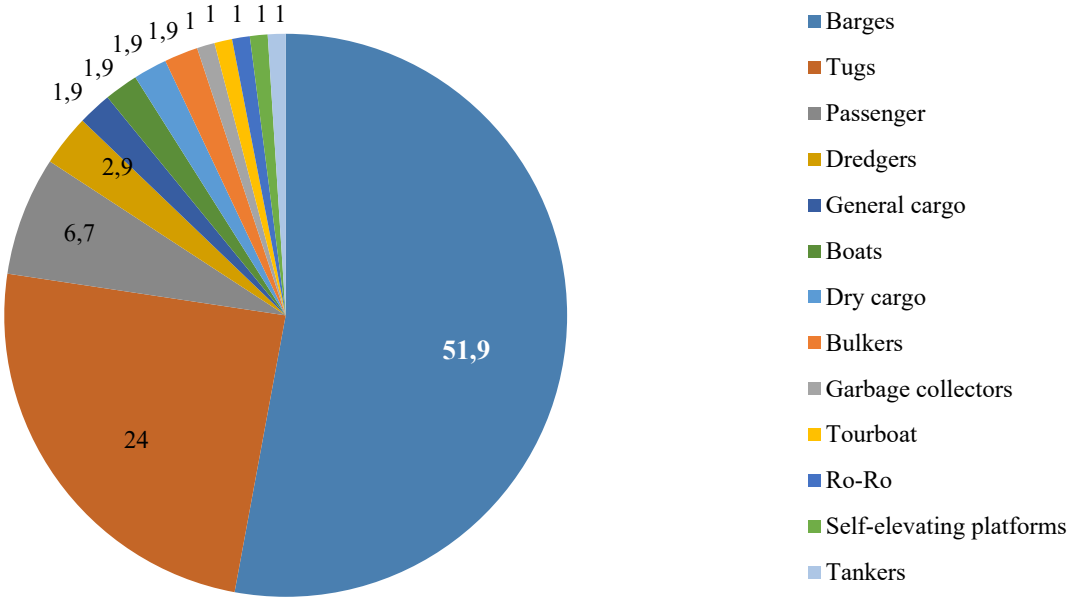

Figure 2. The structure of the order portfolio of Ukrainian shipyards, %

Source: (Overview of the maritime industry of Ukraine, 2020)

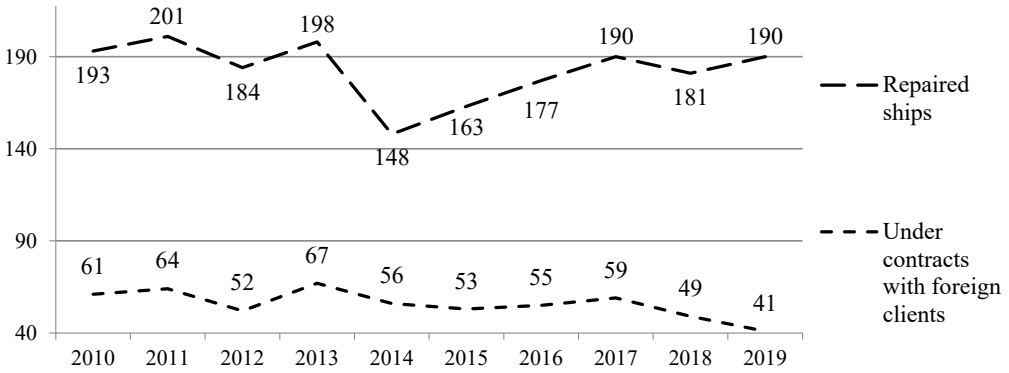

Figure 3. Number of ships repaired at Ukrainian shipyards, units

Source: (Maritime Industry Review, 2020)

the "Southern Ship Repair Company", which was established in Mykolaiv in 2013.

Finally, the last feature of modern Ukrainian shipbuilding is the true flourishing of engineering (Table 3).

As can be observed, the number of bureaus has increased to 12, which is six times the figure that existed during the Soviet era. This figure represents only those in Mykolaiv and Kherson oblasts. Subsequently, only two state-owned enterprises have remained under the umbrella of the Ukroboronprom holding. The remainder of the market is comprised of privately owned enterprises that are consistently expanding the scope of their services to both international and domestic clientele. It is imperative to acknowledge the continued presence of three engineering centres in Crimea, namely the Joint-Stock Company "Sudokompozit Design and Technological Bureau" and the Central Design Bureau "Coral". The Chernomorets Central Design Bureau is a particularly regrettable loss. Its specialists took care of the development of design and technological documentation for the repair and modernisation of naval ships.

The majority of operating enterprises are representative of a new generation of investors, management personnel and engineers. The duration of their tenure on the market is of secondary importance; what matters is their approach to the task at hand and the course of action they deem appropriate. This signifies that their enthusiasm and capital have facilitated the emergence of an intelligent services industry that can be likened to the IT business. A novel development strategy based on the standards of the intelligent digital economy was devised and implemented.

Engineering companies are 100% small and medium-sized enterprises. This means that they are characterised by:

– Flexibility and the ability to quickly manoeuvre in response to changes in the environment (requirements of customers, classification societies, technological changes at shipyards, software and hardware upgrades);

Table 3

Shipbuilding engineering bureaus in Mykolaiv and Kherson oblasts

Region	Name	Specialisation
Mykolaiv	SE "Research and Design Shipbuilding Centre"	Combat surface ships and boats, auxiliary vessels and special floating structures
	PKB CHORNOMORSUDNOPROEKT	Vessels of all types and purposes, their conversion and modernization
	LLC "Marine Design Engineering Mykolaiv"	Vessels of all types and purposes
	LLC "Zaliv Ship Design"	Vessels of all types and purposes
	LLC "ALA Design Group"	Yachts, special and small fishing vessels
	LLC Design Bureau "ProLine"	Mega yachts, recreational and service vessels of executive level.
	POSS Torola Ltd	Working documentation for the construction of hulls, completion and equipment of ships, pipelines, plasma technology programs
	"C-Job Mykolaiv" LLC	Vessels of all types and purposes
	LLC "Asaba Design Centre"	Vessels of all types and purposes, combat surface ships
Kherson	Central Design Bureau "Izumrud"	Reinforced concrete floating structures
	Branch LLC "Marine Design Engineering Mykolaiv"	Vessels of all types and purposes

Source: summarized by the authors according to (Overview of the maritime industry of Ukraine, 2020; Zhukova O. et al., 2017; official websites of enterprises)

– the ability to act as an experimental link in the value chain;
– acceptable cost of the work performed, not burdened by high overheads typical for organisations with branched management structures of a bureaucratic type. As a result, the cost of the project as a whole is reduced and its competitiveness is increased. And this advantage does not go unnoticed by customers.

One illustrative example is the company Marine Design Engineering Mykolaiv (MDEM). The principal consumer of its services is Damen Group. As trust between the Dutch partners and the company deepened, the company's portfolio was gradually expanded to include a range of maritime assets, including transport and offshore vessels, pontoons, barges, floating cranes and mega yachts, high-speed ferries, pilots and multipurpose boats, and tugs. In response to the accelerated growth in demand, the management of MDEM has devised a personnel strategy, the ramifications of which are illustrated in Figure 4.

It is noteworthy that the growth rate of the total number of staff has been dominating the number of design engineers since 2012. This was not hindered by the war, as new structural units specialising in digital marketing services and special engineering calculations were created and gained capacity. The company has become a multi-divisional company. The increased workload led to an increase in the number of workplaces.

4. Cluster Prospects of Shipbuilding

The value of a self-created business is a unique asset for each founder. Consequently, they assume responsibility for its safeguarding, endeavour to promote its growth and prosperity. This attitude is intrinsic and is not contingent on the nature of the economic activity, its scale, or its organisational and legal structure. The same can be observed in the case of private owners of new wave shipbuilding companies and engineering bureaus. It was thus decided that they should follow the constructive experience of their foreign colleagues. Furthermore, in the field under examination, clustering has been elevated to the status of state recognition and support (Integrated Maritime Policy of the European Union, 2021). Furthermore, on the European continent, maritime clusters have already constituted their own network (European Network of Maritime Clusters, 2021).

"Ukrainian Maritime Cluster" is the name of the public association, the initiative of which was announced by Mykolaiv enthusiasts in 2019. Since then, work has been carried out to raise awareness of the potential range of participants, the personnel of the governing bodies, key planning decisions that underlie further activities. A year later, all legal formalities were completed. The Maritime Cluster has become a de jure reality. The vision is to build economic relationships between the shipbuilding industry and other maritime industry players, global and national regulators, policy makers and organisations involved in its implementation.

It is obvious that the founders took into account global practice. They built a bridge between industry cluster structures and opened up prospects for integration into the Blue Economy system. This is true, because shipbuilding is essentially a business that creates the means of production for a whole range of other activities: offshore energy, fishing, mariculture, mineral exploration and production, and shipping. The success of each and all of them depends on how well they understand each other. In addition, shipbuilding is part of an extensive supply chain, and thus fuels the business activity of related sectors of the economy (metallurgy, machine building and instrumentation).

This interpretation of the vision is corroborated by the cluster mission formula. The objective is to advance the development of the Ukrainian maritime economy by uniting the efforts of the enterprises that comprise it. The focus of attention today is the

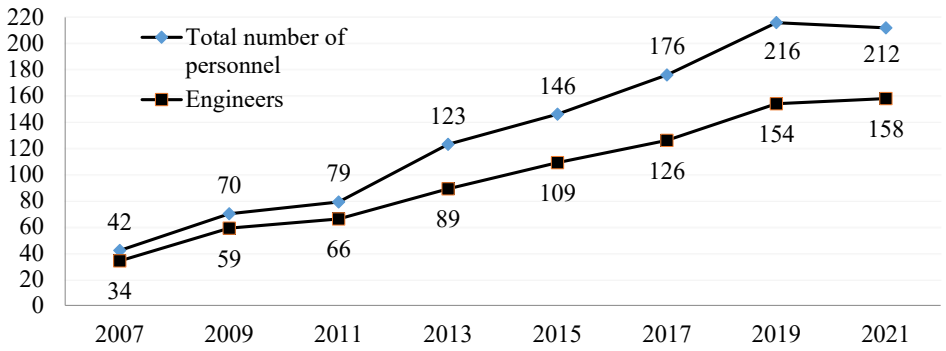

Figure 4. The number of "MDEM" personnel, persons

Source: compiled by the authors on the basis of data from the MDEM HR department

sustainable development of a climate-neutral, circular, productive Blue Economy. It is evident that this cannot be achieved without the decarbonisation of maritime transport, the definition of emission control zones, a new vision of the role of ports, and the preservation and increase of natural capital. It is therefore essential to unite the efforts of all stakeholders.

And the shipbuilding industry in Mykolaiv and Kherson oblasts should become a model for others. This directly follows from the analysis of the first 19 cluster members. Shipbuilding and ship repair companies account for 32% of them. Shipbuilding companies account for 16%. Business associations, business support centres, educational institutions, and the administration of the Mykolaiv hromada account for 15%. Most notably, 37% are related businesses. The idea turned out to be exciting, attractive, promising and full of optimism. It has found supporters who link their future to the prospects of shipbuilding.

The cluster administration ensures that it meets the relevant expectations. Its structure and staffing are based on the principles of reasonable sufficiency. Currently, the staff consists of four employees, headed by an executive director. The head of the engineering company MDEM was unanimously elected to this position. Given the modest size of the entrance and membership fees and the costs of financing the planned activities, the staff's activities are fully categorised as "volunteer".

The supervisory board is responsible for overseeing the efficiency of the top manager and the quality of work of her subordinates. The supervisory board is elected by the general meeting of authorised representatives of the participating enterprises. In order to enhance the legitimacy of significant strategic decisions, several committees have been established, including the "Shipbuilding and Ship Repair", "Naval Shipbuilding", "R&D and Education", and "Marine Equipment and IT" committees. It is anticipated that a new committee, the "Ports and Shipping" committee, will be established in the near future.

Nevertheless, critical infrastructure, including ports, is currently the subject of sustained and intense fire. It has been demonstrated that a cluster will flourish when the firms operating within it are able to enhance their competitiveness through the creation of a more conducive business environment. In order to achieve this, it is necessary to enhance the capabilities of personnel, gain access to crucial components of infrastructure and finance (including foreign investment), and sustain demand for their products. With this in mind, the administration has formulated a number of value propositions for current and potential cluster partners:

1. Use of joint assets. In particular, the website, development funds, advertising materials, stands and space at exhibitions and fairs. It is expected that in this way, everyone will save their own money and achieve their business goals more quickly.
2. Information exchange of business intelligence and customer databases to establish production and innovation cooperation at home and abroad.
3. Accounting and segmentation of value chains and the development of competitive strategies based on this that align producers' resources with market needs.
4. Dissemination of information on the market positioning of cluster members, joint and individual PR to improve their image and reputation, search for partners and customers.
4. Integration and leadership in local high-tech development programmes through participation in the creation of industrial and technology parks, accelerators of relevant start-ups, and Industry 4.0 centres.
6. Fundraising and innovation brokerage to find sources of concessional financing and grant support for development projects (improving business processes, upgrading technologies, supporting innovations, improving the level of knowledge and skills of staff).

The use of the Now-How-Wow Matrix technology during the strategic sessions allowed to identify the main areas of the cluster's activities. These include the presentation of the shipbuilding industry on the international stage, the overcoming of staff shortages, the development of innovation infrastructure (in particular, in the field of digital technologies), and the lobbying of the industry's interests in state legislative and executive authorities. Each is updated with comprehensive annual plans, approved and supported by available funding sources. The distribution of activities is based on the determination of priorities, which is achieved through the evaluation of efforts and the potential for achieving results.

Today, this promising project is on hold. The war (the real one – cruel and relentless) has taken its toll. At the same time, it should be noted that business, at least in the machine-building sector, continues to operate, overcoming incredible organisational challenges and personal tragedies of its employees. This means preserving, above all, the intellectual potential for the future. The authors are convinced that the "Phoenix" effect will definitely manifest itself again.

5. Conclusions

The objective of this study was to ascertain whether shipbuilding in Ukraine has a future, based on a comprehensive analysis of historical data

and a detailed examination of recent industry developments. The decline and subsequent resurgence of domestic shipyards over the course of two centuries was found to be influenced not only by economic considerations, but also by military and political factors. It is regrettable to note that this remains the case.

It has been demonstrated that public administration bodies demonstrated a striking lack of attention to the development of shipbuilding in the pre-war period, which was unnatural and irresponsible. In effect, since the country gained its independence. The identified deficit was partially offset by the initiative of small and medium-sized enterprise owners. Some of them were driven by the need to meet internal requirements. To illustrate, the transportation of agricultural products accumulated in river elevators to marine waters, where transshipment to heavy bulk carriers occurs. Others perceived a demand from external customers for ship repair services and were able to cultivate interest in the quality of work and pricing policy.

Evidence has been obtained indicating a rapid increase in the field of ship engineering. This high-tech, intelligent digital service aligns perfectly with the key trends of Industry 5.0 and is therefore in high demand from well-known global shipbuilding companies. It constitutes the primary foundation upon which business is built. The second is the production of the National University of Shipbuilding, situated in Mykolaiv, and its Kherson branch of intellectual capital, comprising relevant professional competencies. The third approach is the implementation of dual education programmes, which seek to harness the potential of these higher education institutions and relevant stakeholders. Ultimately, it is once more a private business initiative that is the subject of discussion. This individual is keen to establish Ukraine's status as a maritime state. This includes the utilisation of cluster integration of production potentials, which has an extensive reach comparable to that of the blue economy of developed countries.

A number of documented facts demonstrate that there are prerequisites for the deepening and establishment of new forms of cooperation between domestic and foreign shipyards. This is particularly evident in the fields of ship engineering and shipbuilding. In view of the current state of the Ukrainian Navy, it is reasonable to assume that this work will continue for several years. Furthermore, this process should not only result in an increase in the physical volume of ships, but also in the development of new types that can complement the collective power of the participating countries in current and future military-political alliances.

A continuation of this study will facilitate the identification of current trends in the further expansion of industrial clusters for domestic producers. This may be achieved by extending the application of this form of business alliance to other industries, such as shipbuilding in European countries. It is imperative to conduct further research into effective dual education technologies, with a view to corroborating the isolated single facts of their application. Based on the current evidence, it can be concluded that their inherent potential remains largely untapped.

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