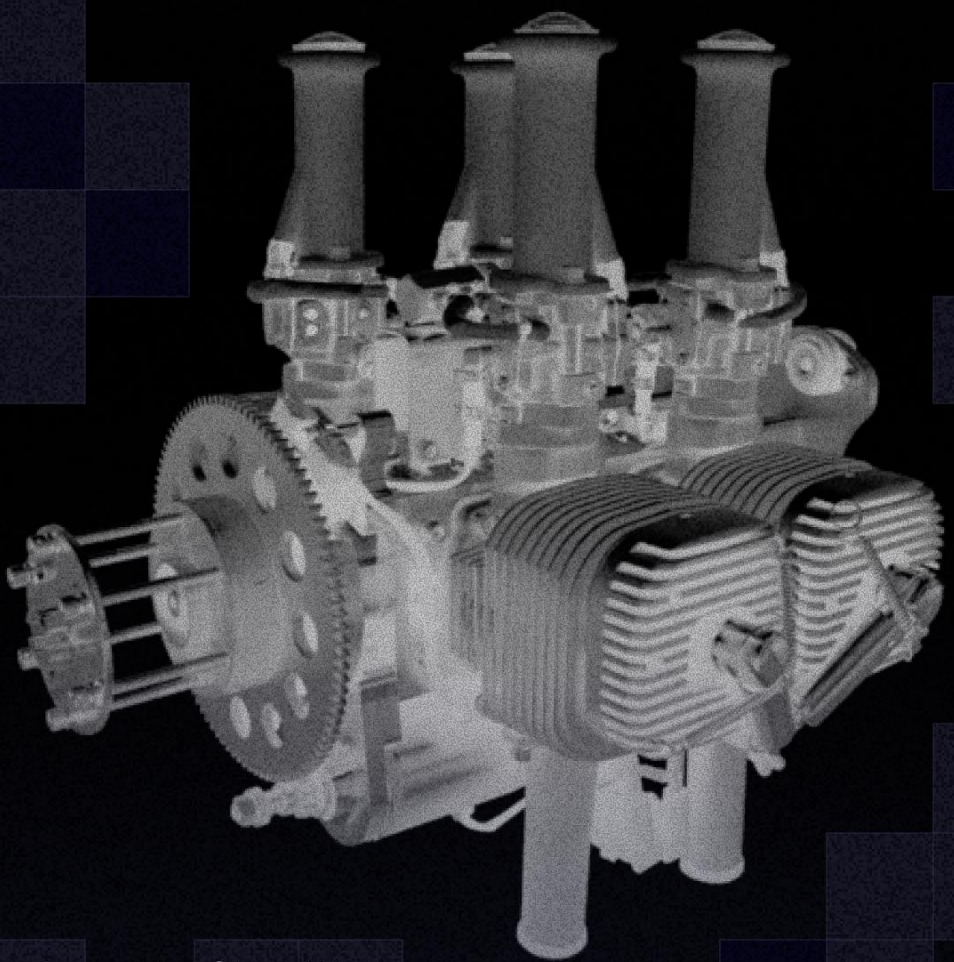
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APRIL 2026

# UKRAINE'S DUAL-USE SECTOR: MARKET OVERVIEW AND FINANCING



By Elmira Hulueva, Olha Bezverkha, Olena Bilousova

Editors: Olga Slyvynska, Marta Bukhtiiarova, Vladyslava Grudova, Nataliia Shapoval

Reviewer: Anna Hvozdiar



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- ENEST-D1@ec.europa.eu — for the attention of Orest Tokac
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# EXECUTIVE SUMMARY

Given the current geopolitical context of Russia's war of aggression against Ukraine, prioritizing investment in strategic industries — including the dual-use and defence sectors — is essential to strengthen defence capabilities, civil resilience, and the economic stability of both Ukraine and Europe.

To this end, the study provides:

- an overview of the dual-use market, including its total size and number of companies engaged
- a review of major sectors and categories of dual-use goods
- an analysis of the structure and dynamics of individual market segments.

This analysis is intended to guide Ukraine's international partners in mobilizing coordinated support for the dual-use sector and aligning investment efforts with Ukraine's strategic industrial priorities.

Dual-use items refer to goods, software, and technologies that are normally used for civilian purposes but may also have military applications or be used for the development, production, or use of weapons. The total production of defence industry goods classified as dual-use products and components in 2024 is estimated at €5.5 billion, involving more than 3,400 companies.

The analysis covers the following sectors:

- Unmanned Aerial Vehicles (UAVs) 50%
- Electronic warfare (EW) – 4%
- Unmanned Ground Vehicles (UGVs) – 1%
- Metal processing machinery – 15%
- Communication equipment – 9%
- Manufacture and repair of aircraft, including spacecraft – 7%
- Other dual-use products and R&D – 5%
- Navigation and sensors – 4%
- Optical and photographic equipment – 3%
- Electronic components and printed circuit boards (PCBs) – 1%
- Engines and turbines – 1%
- Ships and floating structures – 1%

The subsequent analysis covers the overall market size and structure, growth potential, company scale and ownership, and main financial indicators. This provides a comprehensive assessment of the current state of the industry and its prospects.

Between 2019 and 2024, Ukraine's defence and dual-use technology sectors have undergone rapid transformation, marked by dynamic growth, diversification of market participants, and a gradual rebalancing of roles between major producers and smaller enterprises (*see classification in Methodology section*). The central factor shaping these trends is the consistently high demand driven by wartime needs and government procurement priorities.

A common trend for the majority of studied industries is the concentration of revenue solely in large producers. However, from 2022 onwards there has been a noticeable increase in the role of small and micro-enterprises.

This is particularly clear in the UAV segment, where the number of producers expanded sharply, and revenues began to redistribute toward a wider base of participants. This process is associated both with the rapid emergence of innovative players and with the creation of specialized niche solutions that complement mass

production. The analysis of company size across all segments shows that the Ukrainian defence industry is characterized by a wide representation of micro and small enterprises. Most of them employ fewer than 50 people and generate significant revenue volumes collectively, although individual productivity remains lower compared to medium and large enterprises. Medium-sized companies (50–500 employees) often form the financial backbone of the industry, generating the largest share of revenues. Large enterprises with more than 500 employees are relatively few, but they provide stability of output and the ability to fulfil long-term contracts.

Financial indicators show fluctuations associated with the effects of wartime economic conditions. Revenue and assets increased significantly after 2022, reflecting the growing demand for dual-use products. At the same time, liabilities also increased, which suggests intensified borrowing and dependence on external financing.

Between 2019 and 2024, the components as dual-use goods sector demonstrated strong growth with notable fluctuations. Revenue fell sharply in 2020 after starting at nearly €1 billion in 2019, but then steadily increased, reaching €2.5 billion in 2024, the highest level of the period. Fixed assets grew until 2023 but dropped significantly in 2024, while current liabilities rose sharply from 2021 onward, peaking in 2023 at €2.67 billion before slightly declining. In the segment of defence industry products as dual-use goods, revenue surged from €38 million in 2020 to nearly €2.9 billion in 2024, with the steepest growth after 2022. Fixed assets expanded until 2023 before a slight decline, while current liabilities rose steadily to €360 million. The figures point to rapid scaling, where income growth outstripped asset accumulation and liabilities, signalling strong demand and structural change.

Overall, the Ukrainian dual-use industry demonstrates a shift from dominance by a narrow group of large enterprises to a more diverse ecosystem with growing roles for small and medium companies. In 2020, no company in the defence industry products as dual-use goods segment reached annual revenue above €20 million, whereas the components as dual-use goods segment already included 7 such companies. By 2024, the figures rose to 35 and 19 companies, respectively. The general trend indicates sustainable growth, structural diversification, and the formation of new high-tech niches with potential for long-term integration into both domestic and international markets.

In 2025, Ukraine's defence and dual-use sector saw growing investor interest despite wartime risks. The main driver of financing was state-backed grant programs, especially the Brave1 cluster ($78 million of grants in 2025), which became the key platform for supporting startups and innovators. Alongside it, the Ukrainian Startup Fund and several new initiatives expanded support for early-stage projects in UAVs, robotics, software, and other technologies. The government complemented grants with preferential loans for critical enterprises.

International investors (mainly, Venture Capital) began cautiously entering the market, focusing mainly on software and service hubs. Total investment in 2024 is estimated as $18 million, while some projects may not be publicly disclosed. At Defense Tech Valley 2025 in Lviv, Ukraine's defence tech sector attracted record commitments, with four international funds announcing over $100 million in planned investments.

International and development finance institutions continue to exclude direct arms financing, and to date there is no public evidence that they have provided financial instruments like guarantees or credit programs to dual-use industries, although in recent years some institutions have taken steps to expand their mandates toward security, resilience, and defence-related supply chains. Overall financing landscape analysis show that most IFIs and DFIs are still closed for defence and dual-use projects. Even if there is no prohibition for dual-use, policies and priorities anyway force institutions to select more civil projects.

Ukraine's dual-use industry has evolved into a two-tier ecosystem. On one side, there are established companies with proven products, investor engagement, and sustainable models that serve as anchors for future growth. On the other side, a larger pool of smaller and younger enterprises—born out of wartime demand—are innovative and dynamic but face systemic liquidity shortages and obstacles accessing working capital, particularly due to procurement rules that delay payments and rarely provide pre-financing. These structural constraints make targeted financial support critical.

To address these challenges, several complementary measures are recommended:

- Work through trusted Ukrainian institutions. Channel financing via local banks and public programs that already manage defence-related operations, reinforced by EU guarantees, concessional resources, and risk-sharing mechanisms.
- Reconsider restrictive definitions of dual-use. Current rules (e.g., the 10% military threshold used by some DFIs) divert financing away from strategically important projects and are no longer appropriate under wartime conditions.
- Tackle liquidity constraints directly. Expand concessional working-capital credit (such as the "5-7-9" programme) and create facilities that turn signed procurement contracts into bankable assets.
- Sustain innovation with grants. Maintain and expand grant support through programmes like Brave1, USF Dual-Use, and Horizon Europe/EIC Accelerator to fund high-risk, early-stage development.
- Target equity finance strategically. Use equity investment selectively for established firms with solid governance and growth capacity, while relying on grants and concessional debt for younger companies.
- Integrate risk-mitigation tools. Pair every instrument with political and war-risk insurance, export credit guarantees, and portfolio guarantees for local banks to protect against the risk of disruption.

Mobilizing all available sources of financing, including international civilian and economic assistance, to support dual-use industries can simultaneously enhance Ukraine's defence potential and generate economic growth, employment, and broader macroeconomic stability.

Unlocking institutional and private investment into Ukraine's dual-use sectors will be key to expanding production capacities, fostering innovation, and addressing capital needs necessary for long-term sustainability.

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# OVERVIEW AND STRUCTURE OF DUAL USE MARKET

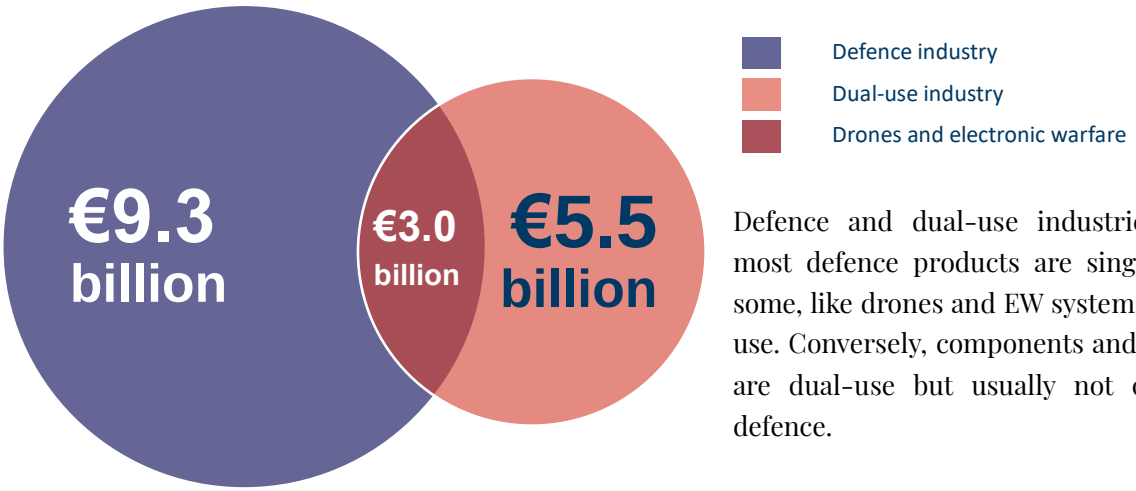
The defence market in Ukraine strongly overlaps with the dual-use sector. While most defence industry products are classified strictly as military, a growing share of output—such as drones, unmanned ground vehicles, and electronic warfare systems—can be treated as dual-use goods. This distinction is significant, as it broadens the range of financing instruments available, including those that would otherwise exclude purely military items.

In 2024, Ukraine's defence industry produced an estimated €9.3 billion in output.[1] Dual-use goods—such as UAVs, UGVs, and electronic warfare systems—accounted for 32% of total defence production in 2024, with 300+ companies

Another part of dual-use goods is represented by components, which can be used for military purposes. Ukraine produces electronic components, navigation, sensors and metal cutting tools, which can be considered dual use and require support.

The total production of defence industry goods classified as dual-use products and components in 2024 is estimated at €5.5 billion, involving more than 3,400 companies. Of this amount, 50% is represented by UAVs. A further 46% consists of dual-use components, primarily in the following categories: metal processing machinery (15%), communication equipment (7%), and manufacture and repair of aircraft and spacecraft excluding UAVs (9%).

## FIGURE 1. DEFENCE AND DUAL-USE INDUSTRY STRUCTURE




Defence and dual-use industries overlap: most defence products are single use, but some, like drones and EW systems, are dual-use. Conversely, components and machinery are dual-use but usually not counted as defence.

Source: KSE Institute

While both defence goods and components are formally classified as dual-use goods, they represent two distinct market segments. In the case of defence production—such as UAVs—the primary customer is the government, represented by the Defence Procurement Agency, alongside brigades, charitable foundations, etc. By contrast, for dual-use components, the main buyers are other defence industry enterprises. However, this segment is also strongly shaped by government demand, as since 2022 the military share of component usage has grown substantially within overall procurement patterns.

We identified dual-use goods categories based on what is present and growing on the Ukrainian market and their clear connection to military use — i.e., areas with high potential to scale for defence needs. The report

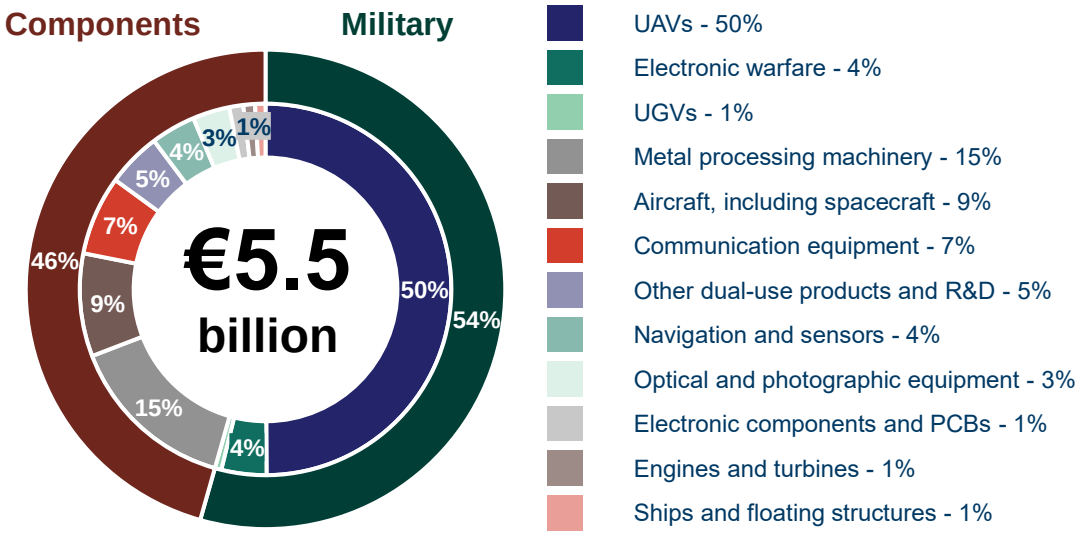
[1] Source: KSE Institute

therefore focuses on sectors where commercial activity, industrial capacity and battlefield relevance overlap (for example: UAVs, communications, metal-processing machinery, navigation and sensors).

Other dual-use categories exist but are not covered here because they are either less directly connected to current military demand or difficult to separate from low-tech civilian activity – including many general industrial goods, consumer electronics, and some medical or agricultural products. Covering those would dilute the study's defence-industrial focus without adding actionable insight.

It is important to note that while Ukraine is scaling the production of munitions, this study does not cover explosives or their precursors. Although explosive precursors are technically dual-use, Ukraine lacks standalone precursor production. Existing capacity is largely integrated into the manufacture of final munitions, which are not considered dual-use. This reflects the acute global shortage of explosives: all available materials are channelled directly into end-product munitions, leaving no separate market for precursors and explaining their exclusion from the scope.

## FIGURE 2. DUAL-USE INDUSTRY STRUCTURE BY REVENUES, 2024

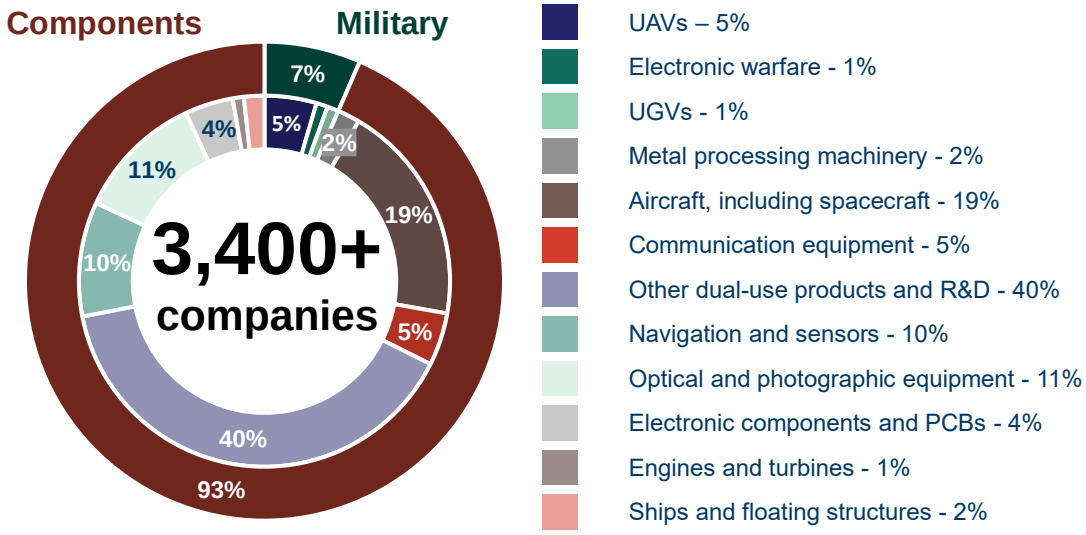



Source: KSE Institute

While UAVs accounted for the largest share of output, companies producing UAVs represent only 4% of all firms in the industry. So, a small group of UAV producers, representing only 4.5% of firms, generates the largest share of industry revenues. Overall, defence industry product manufacturers make up 7% of the total, while the remaining 93% are component producers.

Within the component category, the largest group is Other dual-use products and R&D, which together involve more than 1,300 companies. This segment includes a significant number of legacy Soviet-era entities, many of which report low revenues and low potential for restructuring and further development. Although these companies account for 40% of all dual-use producers, their share of total revenue was only 5% in 2024.

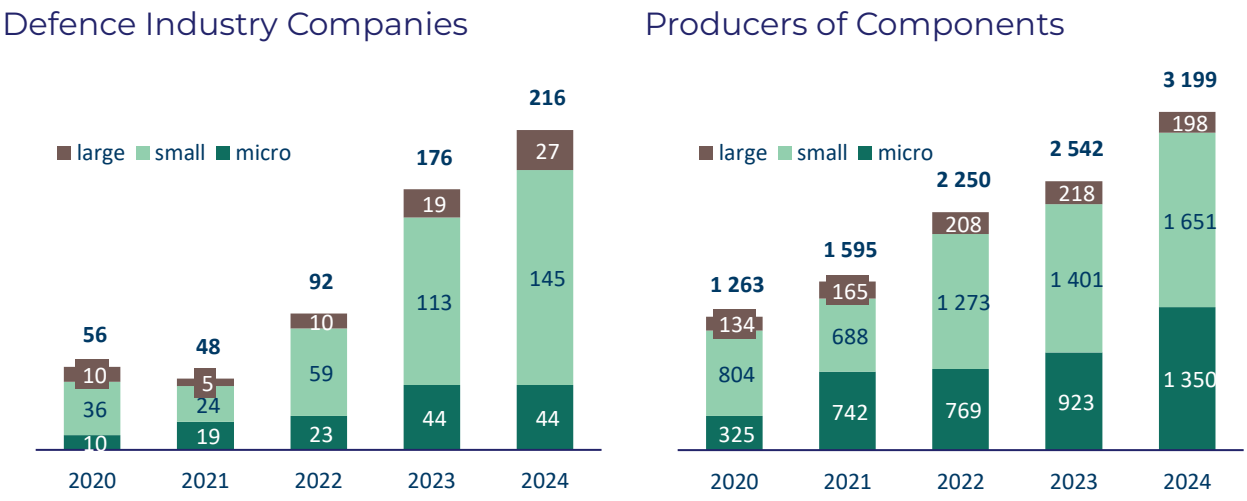
## FIGURE 3. DUAL-USE INDUSTRY BY QUANTITY OF COMPANIES, 2024




Source: KSE Institute

Across most of the industries studied, revenues are concentrated among large producers. Yet, since 2022, small and micro-enterprises have gained a noticeably stronger role. In the defence dual-use sector, their share grew from 45% in 2021 to 67% in 2024. A similar trend can be seen among component producers, where the share increased from 43% to 52% over the same period.

## FIGURE 4. DUAL-USE COMPANIES' QUANTITY BY SIZE




Source: KSE Institute

# DEFENCE INDUSTRY PRODUCTS AS DUAL-USE GOODS

## Unmanned Aerial Vehicles (UAVs)

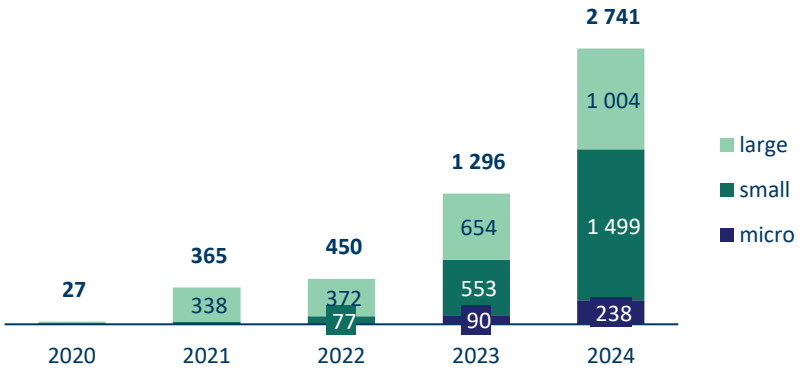
In 2024, the Ukrainian unmanned aerial vehicle (UAV) sector generated an estimated €2.7 billion in output, accounting for roughly 50% of the total dual-use and components market — the largest segment within the industry. According to our estimates, 155 companies were active in the sector in 2024, marking a 12% increase compared with the previous year. Private companies account for 82% of all entities in the sector, while state-owned enterprises represent about 16% of total market value. Market concentration remains high: the top five producers capture 41% of total revenues. The expansion in revenues was accompanied by a proportional rise in current liabilities, reflecting both increased production activity and higher financial exposure.

By 2025, Ukraine has significantly scaled up the production of unmanned systems, particularly FPV drones, to several million units per year. This includes reconnaissance drones with high-quality optics, strike-reconnaissance UAVs, and kamikaze drones, as well as maritime and larger strike drones. Production has expanded roughly 100-fold (from €27 million to 2.74 billion), supported by government backing, the removal of import duties on components, streamlined bureaucracy, and partnerships with international companies. UAV production is widely diversified and includes almost all types, from small FPV drones to deep-strike models. The variety of platforms and rapid adoption of new technologies position Ukraine as a leading actor in the use of drones on the modern battlefield.

### General market size and structure

In 2020–2024, the unmanned aerial vehicle (UAV) manufacturing segment experienced significant growth in both scale and structure. In 2020, the market size was minimal at only €27 million, with a considerable share generated by large manufacturers. This reflected the limited commercialization of the segment and its early stage of development.

**FIGURE 5. UAV COMPANIES' SIZE, € MILLION**




Source: KSE Institute

By 2021, the market had expanded more than thirteenfold to €365 million, mainly driven by large companies that continued to dominate the sector. In 2022, growth persisted, reaching €450 million, while small companies increased their activity and strengthened their role.

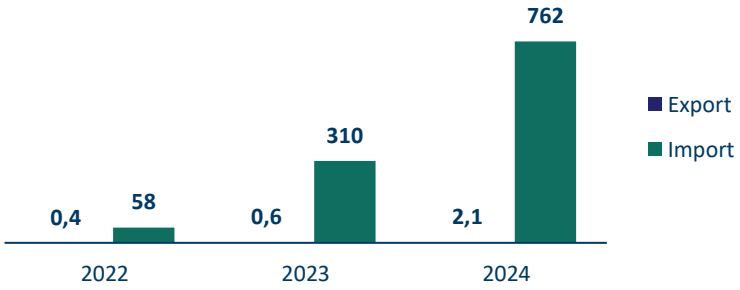
In 2023, the market surpassed €1.3 billion, and in 2024 it doubled again to €2.7 billion. Although UAV producers represent only about 4% of all companies in the dual-use sector, their growth trajectory is exceptional. The segment is expanding rapidly, and this expansion is driven mainly by small and micro enterprises, which generate more than half of the revenues within the UAV niche itself.

Overall, the Ukrainian UAV market is shifting from the concentrated dominance of large enterprises to a more balanced and competitive structure. The expansion of small and micro enterprises enhances flexibility, accelerates technological development, and contributes to greater resilience in the medium term.

## Growth potential (estimated capacity, trade data analysis, other considerations)

Several factors complicate the assessment of the UAV sector's growth prospects in Ukraine. International trade in these products is regulated under martial law: export restrictions remain in force, and since 2023 UAVs have been assigned a separate customs code, making comparisons with earlier periods difficult. As a result, official statistics do not fully capture the sector's potential, particularly regarding exports.

### FIGURE 6. UKRAINIAN INTERNATIONAL TRADE, € MILLION




Source: KSE Institute

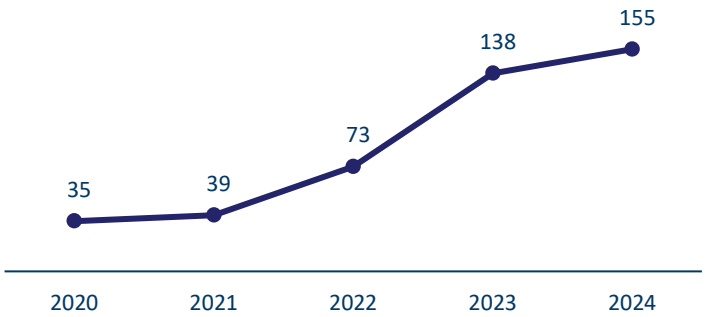
At the same time, the domestic market demonstrates consistent growth. Import volumes increase annually, driven by steady demand from the Armed Forces of Ukraine and other state institutions. This suggests the existence of an unmet domestic demand that Ukrainian producers are gradually beginning to satisfy.

Thus, while international indicators do not yet provide a reliable basis for assessing export potential, domestic demand underpins the expansion of production and the gradual reduction of import dependency.

## Number of companies

The number of companies in the UAV manufacturing sector has been growing steadily. In 2020, there were 35 active companies, rising to 155 by 2024.

### FIGURE 7. NUMBER OF COMPANIES



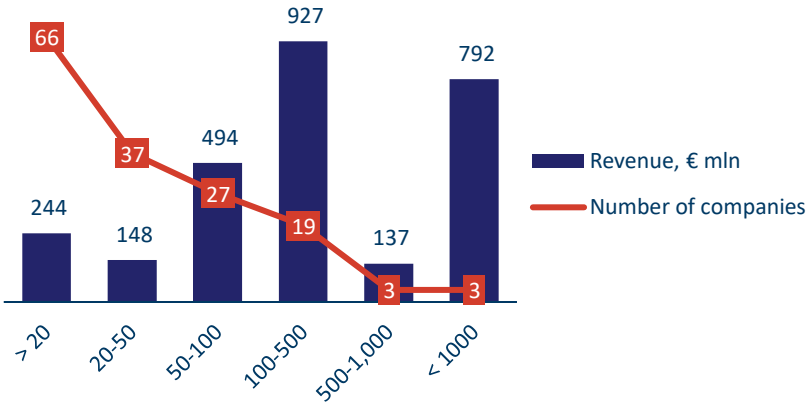

Source: KSE Institute

The most rapid increase occurred in 2022–2023, when the number of firms nearly doubled. This indicates the entry of new producers and expansion of the market in response to growing demand. As a result, the industry is marked by high dynamics and significant potential for attracting new participants, contributing to a more competitive environment.

## Companies' size

In 2024, the Ukrainian UAV industry comprised 155 companies with notable variation in scale. The largest group consisted of 65 firms employing fewer than 20 staff and generating combined revenue of €244 million. Another 37 companies with 20–50 employees generated €148 million in revenue.

### FIGURE 8. REVENUE BY COMPANIES' SIZE




Source: KSE Institute

Medium-sized companies (50–500 employees) represented about one-third of the market and produced the largest share of revenues, exceeding €1.4 billion. This underscores their pivotal role in industry development.

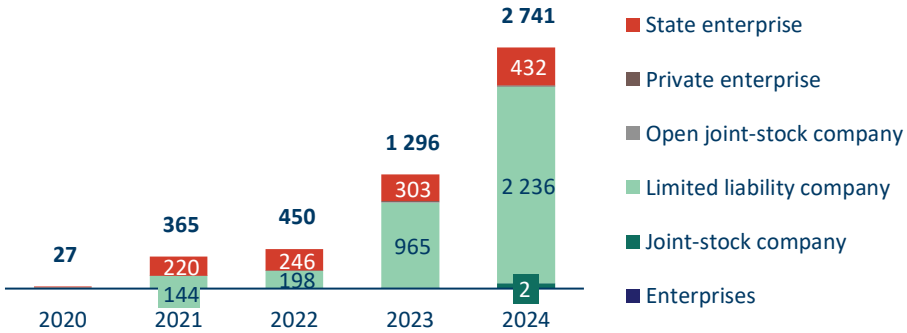
Large enterprises with over 500 employees remained few (six firms) but generated more than €900 million in revenue collectively. Thus, the market combines numerous small, flexible producers with a smaller set of large players that ensure scale and stable production volumes.

## Ownership structure

The ownership structure is dominated by limited liability companies (LLCs), which in 2020–2024 consistently accounted for the largest share of revenues. In 2024, LLCs generated €2.24 billion, more than 80% of the total. This concentration reflects the prevalence of small and medium enterprises using this legal form.

Private enterprises demonstrated fluctuating revenues, ranging from zero in 2021 to €14 million in 2023, indicating only a modest presence in the sector. Joint-stock companies (both open and closed) also played a role, with combined revenues reaching €60 million in 2024.

### FIGURE 9. OWNERSHIP STRUCTURE, € MILLION




Source: KSE Institute

Before the full-scale invasion, state-owned enterprises accounted for more than half of the sector's revenue. However, their share has since declined, falling to 16% in 2024. In UAV production, there is currently only one state-owned enterprise, generating around 16% of the sector's total revenue. This concentration highlights

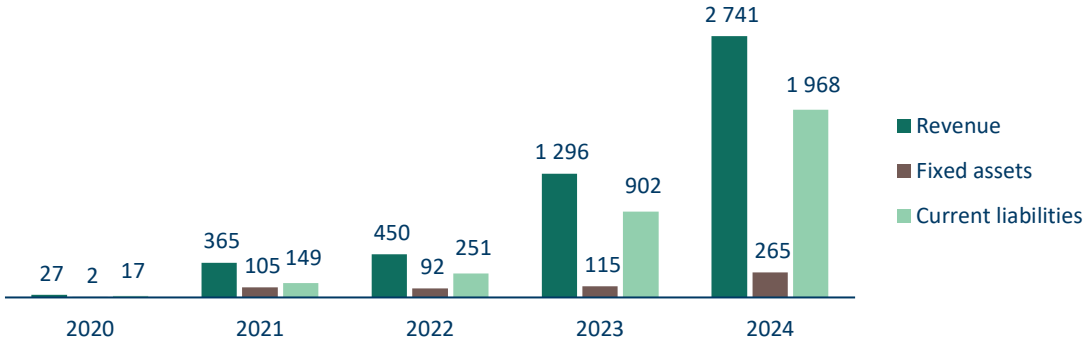
its strategic importance, as even with a minimal presence it secures a significant share of the market. Until 2023, there were two state-owned enterprises operating in this segment.

Thus, the sector's ownership structure is characterized by the strong predominance of LLCs, while other forms of ownership occupy secondary positions.

## Main financial indicators

The financial results of UAV manufacturers in 2020–2024 demonstrate rapid growth. Revenue in 2020 amounted to only €27 million. By 2022, it had risen more than sixteenfold to €450 million, and in 2024 it reached €2.74 billion. This reflects both the significant expansion of the sector and the sharp rise in business activity, driven by strong demand.

### FIGURE 10. MAIN FINANCIAL INDICATORS, € MILLION

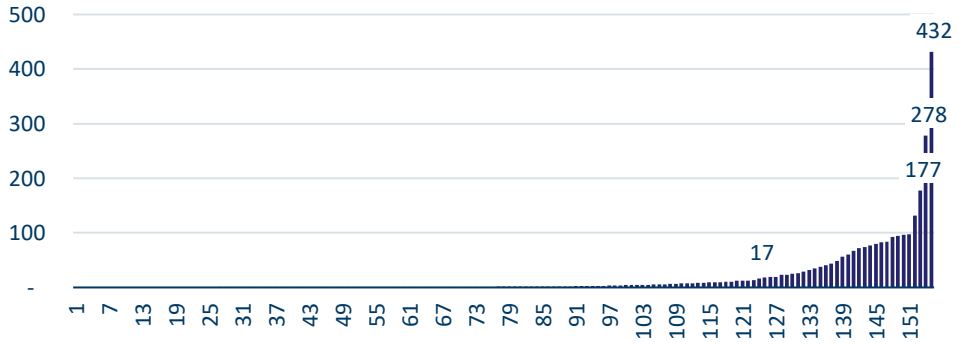



Source: KSE Institute

Fixed assets displayed uneven dynamics: from €2 million in 2020 to €105 million in 2021, followed by fluctuations in 2022–2023 (€92–115 million) and a sharp increase in 2024 to €265 million. This pattern reflects inconsistent investment in long-term assets, but also a revival of investment activity in 2024.

Current liabilities rose from €17 million in 2020 to €1.97 billion in 2024. A particularly sharp increase occurred in 2023 (from €251 million to €902 million). This indicates a rapidly growing debt burden, which accompanies market expansion but also heightens financial risks due to greater reliance on short-term resources.

### FIGURE 11. UAV PRODUCERS' REVENUE DISTRIBUTION, 2024, € MILLION




Source: KSE Institute

Revenue distribution in 2024 was markedly uneven. More than 60 companies generated less than €0.2 million annually, while a small number of players concentrated the majority of revenues. The five largest firms accounted for nearly half of sector revenue. This indicates a high degree of market concentration, which may drive further consolidation, including mergers and acquisitions, and gradually force smaller players out of the market.

## Electronic Warfare

In 2024, the sector of electronic warfare (EW) produced an estimated €215 million. This represents 4% of the total dual-use and components market. The sector's production volume as of 2024 increased almost ten times compared to 2021. According to our estimation, in 2024, there were 34 companies active in the sector, which is 26% more than a year earlier. Around 17% of companies are treasury and 13% are joint-stock enterprises, while the remaining firms operate as limited liability or private entities. In 2022, current liabilities exceeded revenues, indicating a period of financial strain; however, the situation improved slightly in 2023–2024, suggesting gradual stabilization of the sector's financial position. Top-5 companies control almost 82% of the segment.

Electronic warfare (EW) encompasses technologies and tools designed to exploit, control, or suppress the electromagnetic spectrum to gain an advantage over a military adversary. EW systems can function in modes of electronic intelligence, electronic suppression, or protection, applying both passive and active methods.

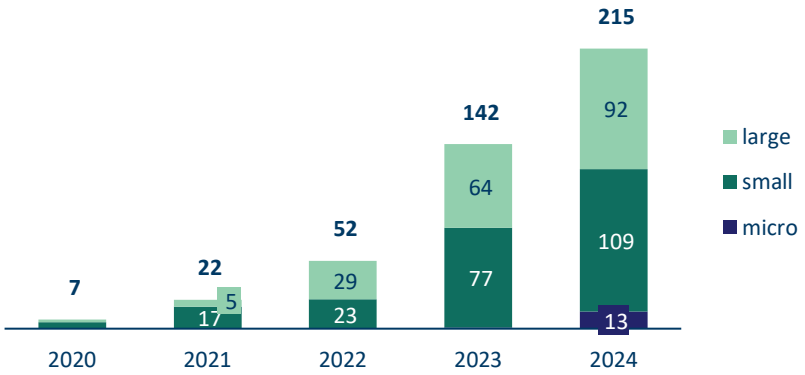
The primary applications are military (detection and suppression of communication channels, navigation and control, countering UAVs, and protection of own systems) and security-related (spectrum monitoring, protection of critical infrastructure). Civilian use is limited, primarily to protection against unauthorized drone activity and mitigation of radio interference.

Because EW technologies span a wide range of solutions, the market is fragmented and largely shaped by demand from the defence sector. International trade is only partially reflected in official statistics, as there are no dedicated commodity codes and high secrecy restricts disclosure.

### General market size and structure

Between 2019 and 2024, the EW and electronic intelligence segment showed gradual expansion. In 2019, the market was valued at €48 million, with most revenues generated by large enterprises (€34 million), while micro firms contributed €14 million. In 2020–2021, activity remained subdued (€7 million and €22 million, respectively), but in 2022 revenues increased to €52 million.

**FIGURE 12. EW COMPANIES' SIZE, € MILLION**




Source: KSE Institute

In 2023, the sector nearly tripled to €142 million, largely due to small enterprises (€77 million), underscoring their rising role. In 2024, the market reached €215 million, with revenues more evenly distributed: small enterprises accounted for €109 million, large companies €92 million, and microenterprises €13 million.

Thus, the market structure has shifted from early dominance by large enterprises toward a more diversified model with an increasing role for small and micro producers. Over the last two years, diversification has

strengthened the ecosystem, suggesting conditions for further scaling. Large enterprises remain important, but their influence is increasingly complemented by the growth of smaller players.

## Growth potential (estimated capacity, trade data analysis, other considerations)

The EW market is highly fragmented and primarily dependent on defence procurement. Assessing international trade is challenging due to the absence of separate commodity codes and the restricted availability of data. Accordingly, reliable estimates of the real market size are limited, and financial indicators serve as the main source for analysis.

In 2019–2024, total revenue in the EW sector increased from €48 million to €215 million. The main growth in 2023–2024 came from small manufacturers (€77 million in 2023 and €109 million in 2024), which proved capable of responding quickly to operational needs. Large enterprises retained a share and generated €92 million in 2024, indicating their significant role.

Further growth potential is shaped by several factors:

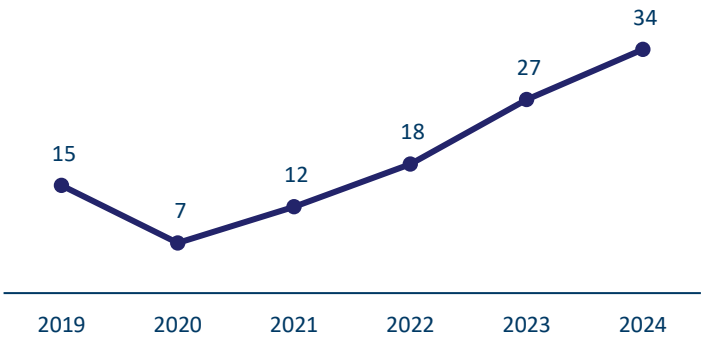
- rising defence spending globally and demand for solutions tested in real combat conditions
- market niches available to small, specialized producers
- risks associated with heavy dependence on government contracts and limited civilian demand

## Number of companies

The number of companies in the EW sector remains modest but is gradually increasing. In 2019, 15 firms were active, rising to 34 by 2024. The sharpest growth occurred in 2022–2023, when the number of participants nearly doubled.

This trend highlights growing interest in the sector and the gradual development of a more stable production base.

**FIGURE 13. NUMBER OF COMPANIES**



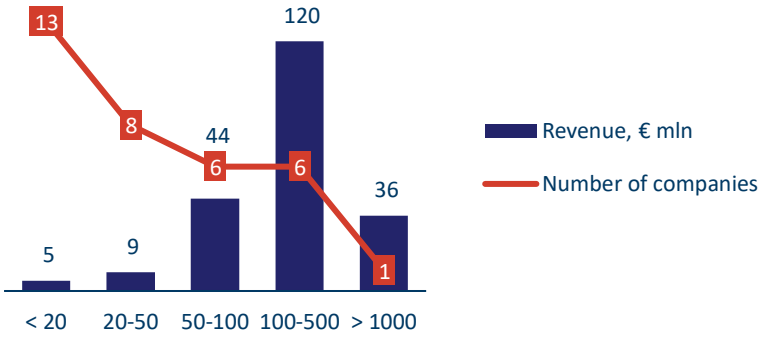

Source: KSE Institute

## Companies' size

In 2024, 34 companies were active in the EW manufacturing segment. Most (21 firms) employed fewer than 50 people, collectively generating about €14 million in revenue, underscoring the importance of small producers.

Medium-sized enterprises (50–500 employees) played the decisive role in revenue generation: 12 companies in this category produced more than €164 million, accounting for the majority of total revenue. Only one large producer exists in 2024 with €36 million in revenue.

## FIGURE 14. REVENUE BY COMPANIES' SIZE




Source: KSE Institute

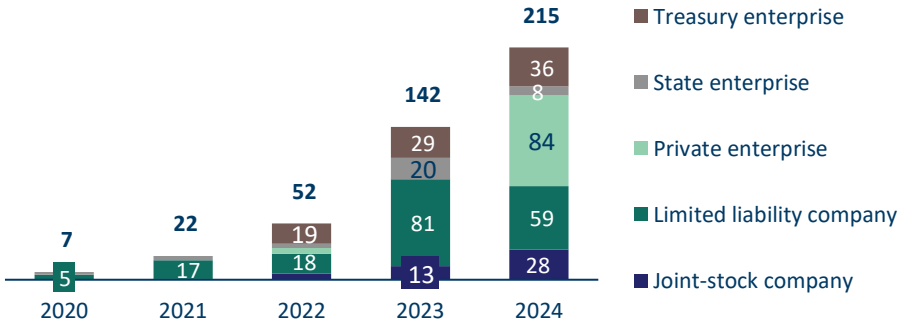
Thus, the EW sector combines many small players with a limited number of medium-sized firms that generate most of the output. This suggests potential for further consolidation and professionalization of the industry.

### Ownership structure

In 2019, revenues were relatively balanced across ownership forms: LLCs (€20 million), state-owned enterprises (€16 million), state enterprises (€8 million), and joint-stock companies (€4 million).

From 2020 onward, LLCs dominated revenues, maintaining a consistently high share (from €5 million in 2020 to €81 million in 2023). Private enterprises initially played a secondary role but surged in 2024, generating €84 million and reaching near parity with LLCs (€59 million).

## FIGURE 15. OWNERSHIP STRUCTURE, € MILLION




Source: KSE Institute

State-owned enterprises contributed €2–20 million during the period, showing a moderate upward trend. Joint-stock companies maintained only a marginal role. State-owned enterprises continue to operate but have either withdrawn from EW production or ceased reporting (having been classified).

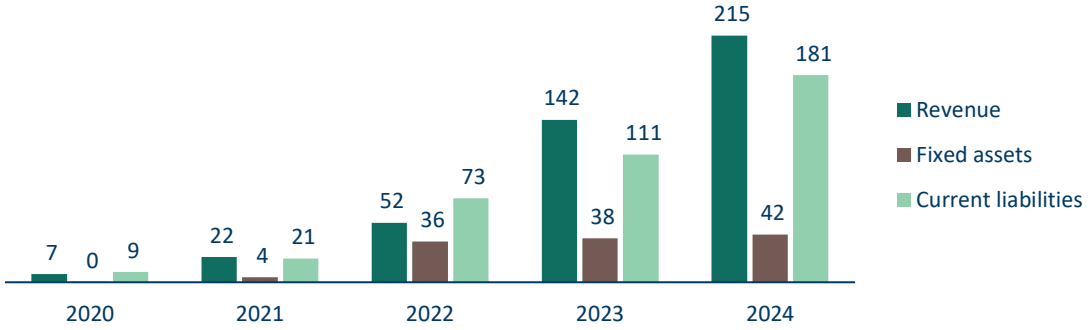
Thus, the ownership structure is characterized by the traditional dominance of LLCs, the growing importance of private firms, and the limited role of treasury, state-owned and joint-stock companies

### Main financial indicators

The financial performance of EW firms shows uneven but generally positive dynamics. In 2019, total revenue was €45 million, followed by a sharp decline to €9 million in 2020, likely due to pandemic-related disruptions.

The sector began to recover in 2021, accelerating in 2022 and reaching €143 million by 2024. This trajectory reflects both resilience and expanding production capacity.

**FIGURE 16. MAIN FINANCIAL INDICATORS, € MILLION**



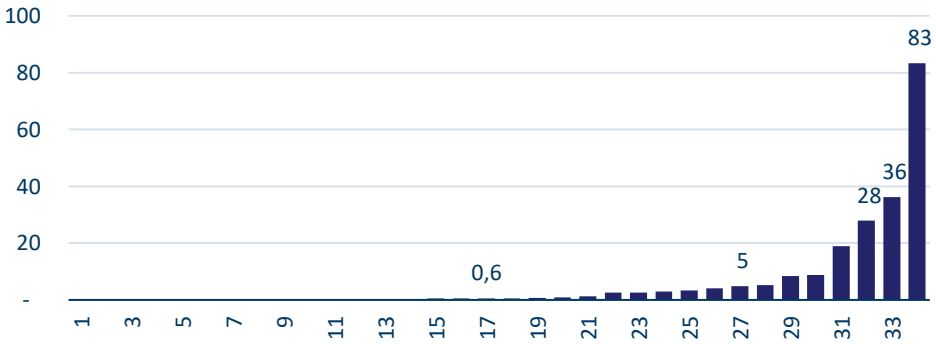

Source: KSE Institute

Fixed assets increased significantly in 2022–2024 (up to €36–42 million), likely reflecting investments in production facilities to support scaling.

Current liabilities grew from €7 million in 2020 to €181 million in 2024, reflecting expanded activity but also rising financial risks.

Revenue distribution remains highly concentrated: most firms earned less than €1 million annually, while only a few generated €20–40 million or more, with the largest player generated €83 million. This points to a fragmented market with many small players and a relatively small group of medium-sized firms generating the majority of revenues.

**FIGURE 17. EW PRODUCERS' REVENUE DISTRIBUTION, 2024, € MILLION**




Source: KSE Institute

## Unmanned Ground Vehicles (UGVs)

In 2024, the Ukrainian unmanned ground vehicle (UGV) sector generated an estimated €31 million in output, accounting for around 1% of the total dual-use and components market. The sector's production volume in 2024 was 17.3 times higher than in 2020. According to our estimates, 34 companies were active in the sector in 2024, a 70% increase compared with the previous year. Market structure remains highly concentrated: the top five companies account for 72% of total revenues. Almost all revenue was generated by limited liability companies. Debt financing has grown steadily, reaching a level in 2024 that exceeds annual revenues, indicating rising financial leverage across the sector.

Unmanned ground vehicles (UGVs) are ground-based platforms that operate without an onboard operator. They can function either through remote control or by using autonomous navigation and control systems. The main areas of application include military (reconnaissance, demining, logistics, fire support), security (patrolling, border control, facility protection), and civilian uses (agriculture, industry, and emergency response).

By 2025, Ukraine has significantly scaled up the production of ground robotic systems, covering almost all types — from logistical and evacuation platforms to combat and engineering systems. Government support, streamlined bureaucracy, and partnerships with international companies have accelerated the sector's development. Key platforms include remotely operated combat modules, armoured assault robots, and robotic systems for demining and logistics. Rapid integration of autonomous functions and coordination with other combat systems ensures effective deployment on the modern battlefield and lays the foundation for further development of robotic capabilities in the armed forces.

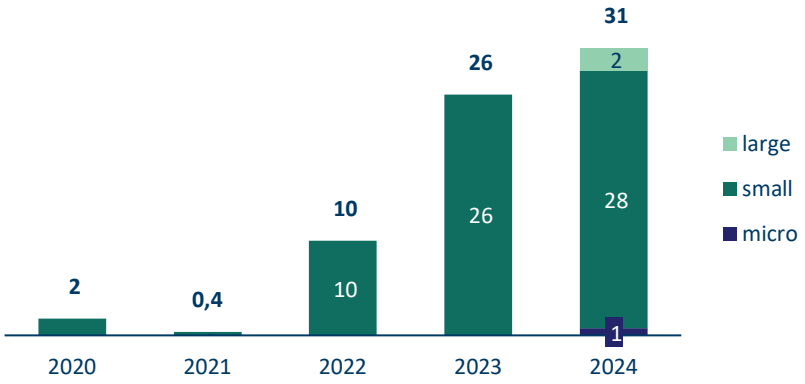
Since UGVs represent a relatively new product category, the market is still in its early formation phase. International trade statistics are not yet available due to the absence of dedicated customs codes.

## General market size and structure

Between 2019 and 2024, the UGV manufacturing segment demonstrated gradual growth from a low base. In 2019, the market was valued at only €2 million, generated by a few individual companies. Activity remained minimal in 2020–2021, but in 2022 revenues rose to €10 million.

By 2023, the sector had grown to €26 million, largely driven by small producers. In 2024, the market increased further to €31 million, with some participation from larger enterprises (around €2 million) alongside small firms.

**FIGURE 18. UGV COMPANIES' SIZE, € MILLION**




Source: KSE Institute

Thus, the market remains dominated by small producers, although in the past two years new entrants have gradually diversified its structure. Large companies have not yet assumed a decisive role, but their presence signals interest in the segment and potential for scaling toward a more sustainable development model.

## Growth potential (estimated capacity, trade data analysis, other considerations)

The Ukrainian UGV sector remains in the early stages of development. Market volumes are still modest: from 2019 to 2021, annual revenues averaged about €2 million, with the first notable increase recorded in 2022 (€10 million). Growth then accelerated, with the sector reaching €26 million in 2023 and €31 million in 2024. Small businesses provided most of this growth, while larger companies are only beginning to enter the market.

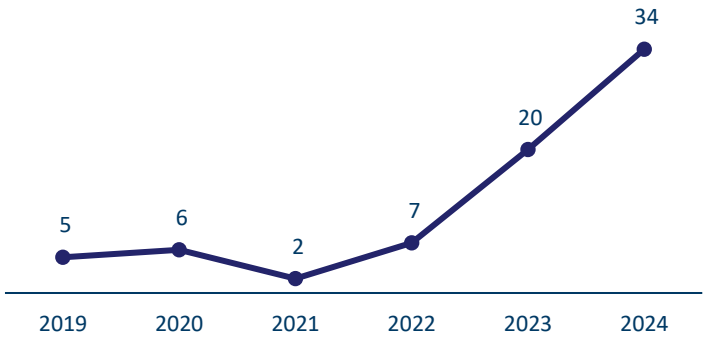
International trade statistics for UGVs are not available from open sources. It is reasonable to assume that export volumes remain minimal, as Ukraine is one of the industry leaders, but exports are currently constrained by high domestic demand.

Given the low starting point and the positive trajectory of recent years, the UGV market has considerable growth potential. Further entry of new companies, intensifying competition, and a gradual transition from small-scale to larger projects can be expected.

## Number of companies

The number of companies in the ground robotics segment remains limited but continues to grow. In 2019, only five companies were active, while by 2024 the figure had risen to 34.

### FIGURE 19. NUMBER OF COMPANIES




Source: KSE Institute

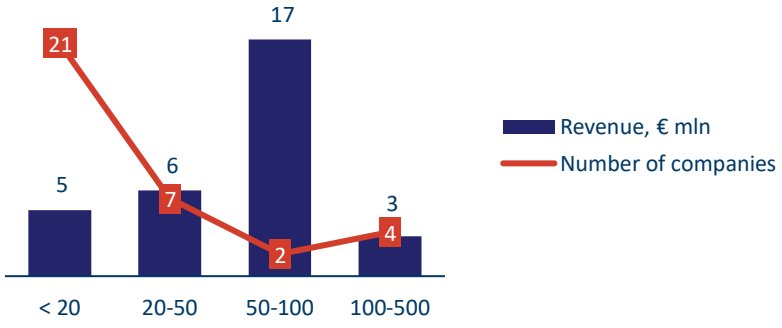
The most dynamic growth occurred in 2022–2023, when the number of firms nearly tripled. This reflects the entry of new producers responding to rising demand and the development of niche applications. As a result, the sector is moving from a nascent stage toward more sustainable growth, laying the foundation for further diversification.

## Companies' size

In 2024, the UGV market comprised 34 companies with considerable variation in scale. The majority (20 companies) employed fewer than 20 staff, generating combined revenue of only €5 million, which underscores the limited capacity of micro and small firms.

Another seven companies with 20–50 employees accounted for about €6 million in revenue. Medium-sized enterprises (50–500 employees, six companies) generated the bulk of revenue, exceeding €20 million.

### FIGURE 20. REVENUE BY COMPANIES' SIZE



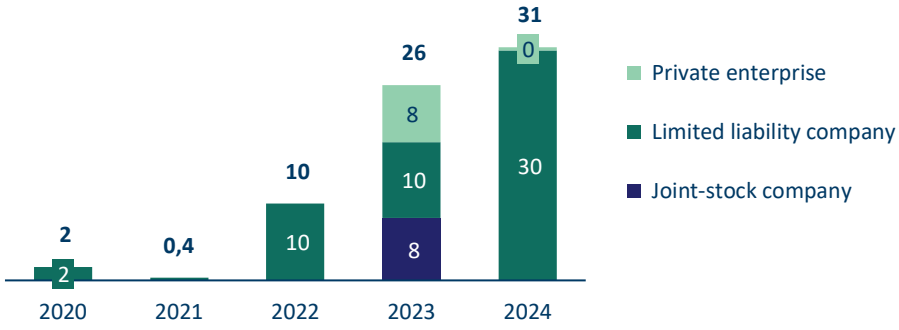

Source: KSE Institute

There are virtually no large producers in this segment: in 2024, no company employed more than 500 staff. Accordingly, the market remains dominated by small and medium-sized enterprises, while large-scale production capacities may emerge only in the future.

## Ownership structure

Limited liability companies (LLCs) dominate the ownership structure. In 2019–2024, they generated the largest share of revenues, €55 million (total for 6 years), including €30 million (99% from total in 2024) . This reflects the widespread choice of this legal form by small and medium-sized enterprises due to its flexibility and accessibility. Joint-stock companies followed a more moderate trajectory, with total revenues of €8 million over 2019–2024, most of which was recorded in 2023.

### FIGURE 21. OWNERSHIP STRUCTURE, € MILLION



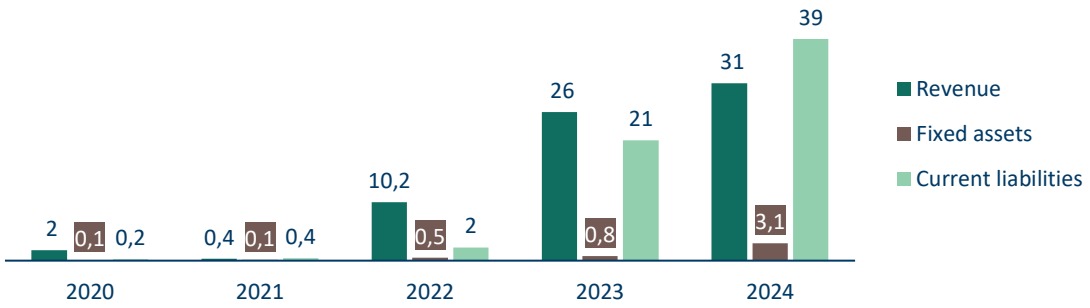

Source: KSE Institute

Thus, the ownership structure is characterized by a strong concentration of revenues in the LLC segment, while private and state-owned enterprises remain secondary and less stable contributors.

## Main financial indicators

The financial results of UGV manufacturers in 2019–2024 show a gradual upward trend. Revenue remained low at about €2 million annually in 2019–2020, dropped to zero in 2021, and then grew to €31 million by 2024. This trajectory reflects a recovery and gradual increase in market activity after a period of stagnation.

### FIGURE 22. MAIN FINANCIAL INDICATORS, € MILLION



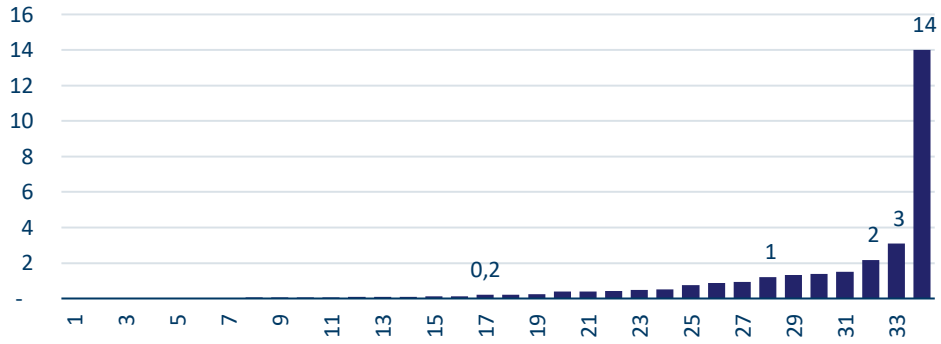

Source: KSE Institute

Fixed assets remained very limited. Until 2022, they were almost negligible, and in 2023–2024 they amounted to only €1–3 million. This indicates a low level of investment in long-term assets and limited modernization of production facilities.

Current liabilities rose from zero in 2019–2020 to €2 million in 2022, €21 million in 2023, and €39 million in 2024. This points to an increase in debt financing, although the overall scale remains small compared to other defence-related sectors.

Revenue distribution in 2024 was highly uneven: most companies generated less than €1 million, while only a few exceeded that level. Overall, a small group of firms concentrated a significant share of revenues, indicating early signs of market concentration even within a relatively small segment.

**FIGURE 23. UGV PRODUCERS' REVENUE DISTRIBUTION, 2024, € MILLION**




Source: KSE Institute

Demining

The production of demining equipment in Ukraine remains at an early stage and is characterized by considerable fragmentation. The main technological solutions currently include unmanned ground vehicles (UGVs) with demining functions, heavy machinery based on existing equipment with additional protection and attachments, as well as emerging UAV-based systems.

Unmanned Ground Vehicles (UGVs). This category comprises both specialized machines designed exclusively for humanitarian demining and multifunctional platforms capable of performing other engineering tasks. Some systems are focused solely on clearing territories, others are developed as universal solutions for transportation, evacuation or reconnaissance, and can be adapted to detect and neutralize explosive devices.

Unmanned Aerial Vehicles (UAVs). Technologies for mine detection using thermal imaging cameras, magnetometers and multispectral sensors are actively being implemented in Ukraine, enabling the mapping of hazardous areas. Experiments are also underway with remote neutralization of explosive devices. This segment demonstrates strong potential, combining domestic expertise in UAV technologies with the growing demand for humanitarian demining solutions. All producers within this segment are UAV manufacturers and are therefore analysed in the corresponding section.

Underwater demining in Ukraine is being advanced through the use of modern technologies such as remotely operated vehicles and sonar-equipped drones, which allow safe detection and mapping of submerged explosives. International companies and Ukrainian partners are beginning to contribute equipment and expertise, with projects already underway to expand capacity. While still a smaller segment of the broader demining market, underwater clearance is expected to grow in importance as Ukraine addresses large-scale contamination in rivers, ports, and coastal areas.

Heavy mechanical machines. This group includes equipment fitted with milling cutters or chain flails capable of neutralizing explosive devices upon contact. Local versions of such machines are being developed in Ukraine, often based on armoured vehicles, industrial machinery or agricultural tractors. The products in this segment are highly diverse and frequently represent ad hoc or artisanal adaptations.

Assessing production volumes and financial indicators in this segment is difficult, as demining equipment is rarely the core activity of manufacturers and producers are dispersed across different industrial sectors. Manufacturers of robotic demining platforms are already reflected in the UGV segment. Producers of heavy demining machines with varying control systems are partly included in other categories, particularly R&D and machine-building. A company developing equipment for underwater demining is covered within the shipbuilding section. Firms adapting agricultural machinery for demining are not considered in this analysis, as their products are yet less an established line of production and more a do-it-yourself, improvised solution.

# COMPONENTS AS DUAL-USE GOODS

## Metal Processing Machinery

In 2024, the Ukrainian metal processing machinery sector generated an estimated €811 million in output, accounting for about 15% of the total dual-use and components market. The sector's production volume in 2024 was 64 times higher than in 2021, demonstrating exceptional expansion driven by industrial recovery and defence-related demand. An estimated 67 companies operated in the sector in 2024 — the same number as in 2023. The market is polarized by company size: while 80% of firms employ fewer than 20 people, 82% of total revenue is generated by companies with over 500 employees. Ownership structures are split, with 55% of firms organized as joint-stock companies and 45% as limited liability companies. Financial indicators show growing strain: in 2024, current liabilities surged, exceeding annual revenues by roughly 30%, pointing to intensified borrowing and capital-intensive expansion.

In Ukraine, under code 28.41 "Manufacture of metal processing machinery," several enterprises maintain expertise in heavy and specialized engineering. The main production areas include:

- Heavy machine tools and processing complexes – lathes, milling machines, and specialized high-power units for metallurgy, energy, and transport sectors.
- Press and rolling equipment – machines for metal deformation used in industrial and engineering projects.
- Mechanical components and tooling – production of parts, specialized devices, and systems for serial and custom machine building.
- CNC machines and modernization – implementation of computer numerical control systems and adaptation of existing equipment to modern technologies.
- Specialized equipment for high-precision processing – solutions for aviation, energy, and defence industry enterprises.

It should be noted that some producers in this segment hold additional NACE classifications directly linked to defence manufacturing, highlighting the dual-use potential of their products and the possibility of integration into military-industrial supply chains.

### General market size and structure

The annual production volume of metal processing equipment in Ukraine can be estimated as the total revenue of companies operating under CEA 28.41. Foreign trade data is aggregated from open sources and the State Customs Service under the following codes:

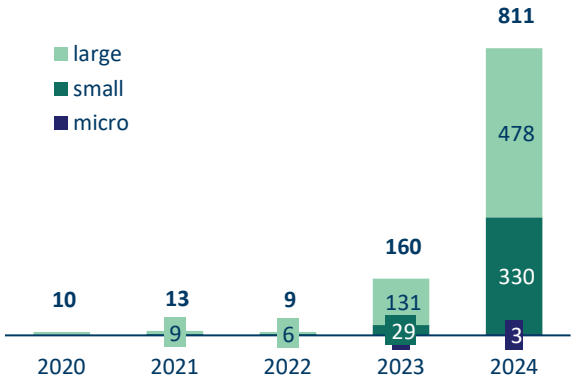
- 845921 – machine tools for drilling by metal removal, with numerical control
- 845931 – machine tools for boring and milling by metal removal, with numerical control
- 845941 – machine tools for boring by metal removal, CNC, not included in 8459
- 845951 – machine tools for milling by metal removal, cranked, numerically controlled
- 845961 – machine tools for milling by metal removal (other than knee type), CNC

The metalworking equipment segment (CEA 28.41) underwent significant structural changes in 2019–2024. Total revenues increased from €7.7 million in 2019 to €12.6 million in 2021 and then jumped to €811 million in 2024. This sharp increase reflects large-scale expansion of production capacity and the attraction of significant credit resources, which also led to a rapid increase in current liabilities.

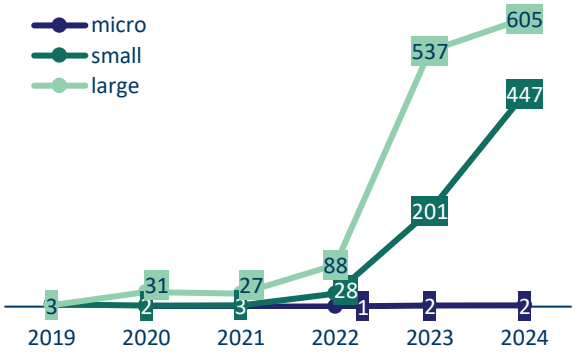
The dynamics of the debt burden confirm this hypothesis: while in 2019 current liabilities amounted to €7.4 million, in 2020 they rose to €33.3 million, and in 2024 reached €1.05 billion. Growth was particularly intense in 2022–2024, when production was scaling up at maximum speed.

## FIGURE 24. METAL PROCESSING MACHINERY STRUCTURAL CHANGES

Companies' Size, € million




Current Liabilities, € million




Source: KSE Institute

Enterprise size plays an important role in the market structure. Microenterprises remain statistically insignificant: their revenues in 2024 were only €3.2 million, with liabilities of €2.1 million. Small companies generated €331.2 million in revenue and €447.1 million in liabilities in 2024, reflecting aggressive investment and active borrowing. Large producers remained the key drivers: in 2024, they accumulated €477.6 million in revenue and €605.1 million in liabilities, meaning their expansion drove the sector's explosive growth.

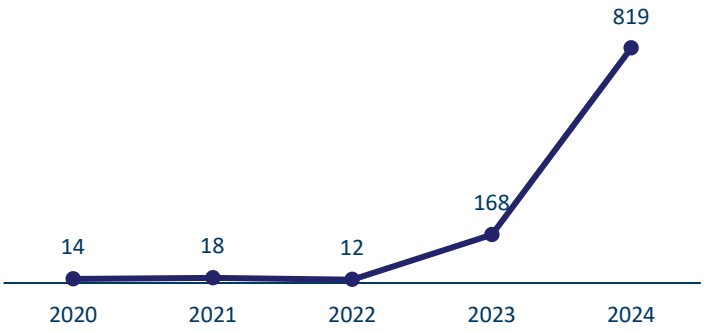
Thus, the metalworking equipment market transformed from a relatively small segment into a large-scale industry sector, where further development will depend on companies' ability to service rapidly growing debt obligations and ensure stable production results.

### Growth potential (estimated capacity, trade data analysis, other considerations)

The segment shows sharp fluctuations in production volumes and market capacity. Until 2022, the market remained relatively small and stable, but starting in 2023, it expanded rapidly due to rising demand, including from defence enterprises.

Market capacity grew from €11.5 million in 2022 to €819 million in 2024, confirming the transition from a niche market to one of strategic importance for industry.

## FIGURE 25. MARKET CAPACITY, € MILLION

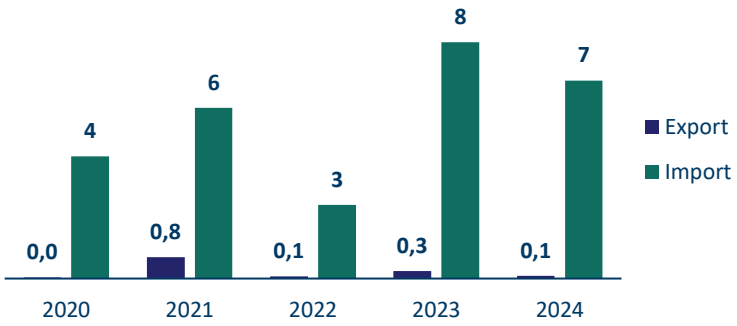



Source: KSE Institute

The import component remains stable in absolute terms, but its relative importance has declined amid the rapid growth of domestic production. Exports remain limited and play no significant role in the market structure, as producers focus primarily on domestic demand. Despite the surge in domestic output, the trade

balance remains negative (from –€2.6 million in 2022 to –€7 million in 2024), indicating continued dependence on external supplies.

## FIGURE 26. UKRAINIAN INTERNATIONAL TRADE, € MILLION




Source: KSE Institute

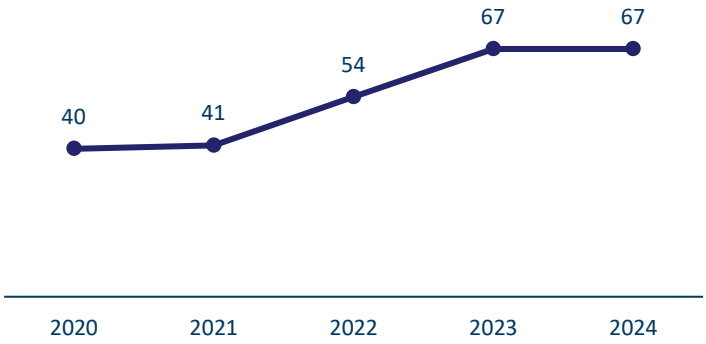
Looking ahead, the main risks are linked to the debt burden and reliance on the domestic market. Nevertheless, the segment retains considerable growth potential, supported by stable demand from related industries. Key factors shaping its prospects include:

- modernization of Ukrainian industry and demand for new equipment
- increasing role of domestic producers in meeting market needs
- limited export opportunities, keeping focus on the domestic market
- high capital intensity and technological complexity of production, creating barriers to entry for new firms

### Number of companies

The number of companies in the segment has gradually increased. In 2020 there were 40 companies, in 2021 – 41. In 2022 the number rose to 54, in 2023 – to 67, and in 2024 it stabilized at 67

## FIGURE 27. NUMBER OF COMPANIES




Source: KSE Institute

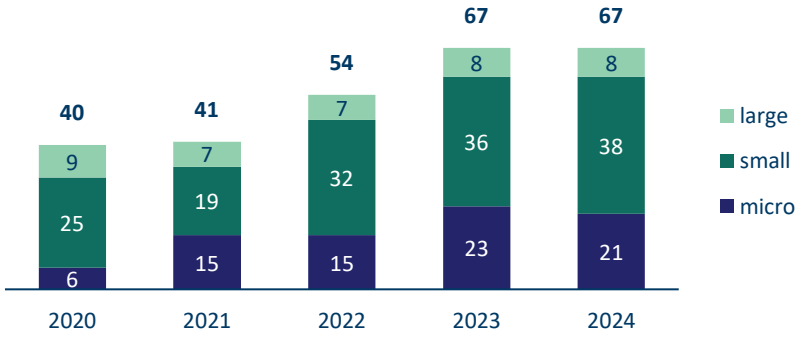
This reflects a more competitive environment and a broader industrial base. The entry of new players coincided with increased investment and market growth, highlighting the direct link between demand expansion and the rising number of producers.

### Companies' size

The segment is dominated by small and microenterprises. Their numbers increased steadily in 2020–2024, showing gradual market expansion and new entrants. Growth was driven mainly by micro and small

companies, while the number of large enterprises remained stable. This indicates that production capacities are concentrated in a few key players, while small firms add dynamism to the market.

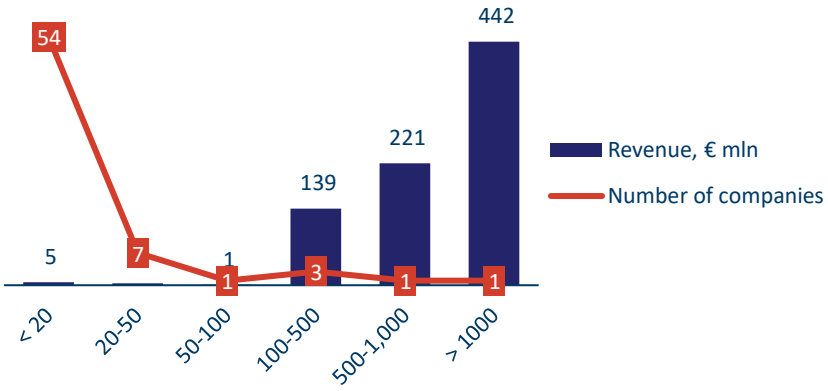
## FIGURE 28. COMPANIES' QUANTITY BY SIZE




Source: KSE Institute

The breakdown by staff and revenue underscores high differentiation. Most companies are small (up to 50 employees), but large enterprises generate the bulk of revenues. In particular, a single company with more than 1,000 employees accounts for almost half of market revenues, while dozens of small firms have limited financial results.

## FIGURE 29. REVENUE BY COMPANIES' SIZE




Source: KSE Institute

Thus, the market combines a wide base of small and microenterprises with a few large producers that concentrate the main resources and determine overall dynamics.

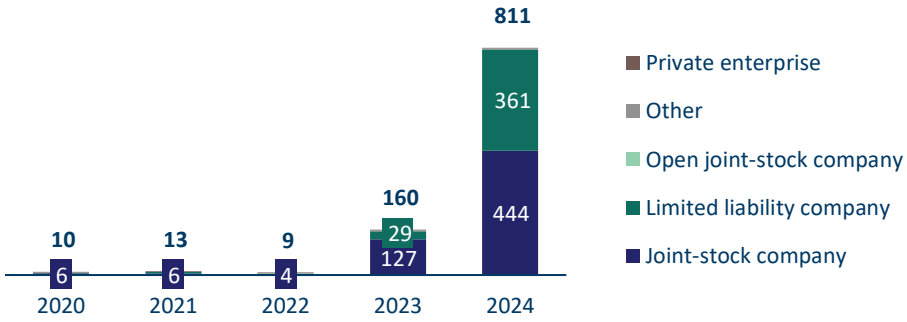
### Ownership structure

In 2019–2021, the market was relatively stable, with total revenue of up to €13 million annually. Joint-stock companies (€6–6.2 million) and LLCs (€4–5.5 million) provided the largest contribution, while other forms of ownership were negligible. In 2022, total revenue fell to €8.9 million, reflecting slower business activity. At the same time, the role of private enterprises increased, while joint-stock companies and LLCs reduced profitability.

From 2023 onward, the situation changed. Revenue rose to €160 million, and in 2024 to more than €812 million. The main drivers were joint-stock companies (€444 million) and LLCs (€361.5 million).

Thus, the ownership structure has concentrated around joint-stock companies and LLCs, which now account for nearly all financial results in the industry.

## FIGURE 30. OWNERSHIP STRUCTURE, € MILLION

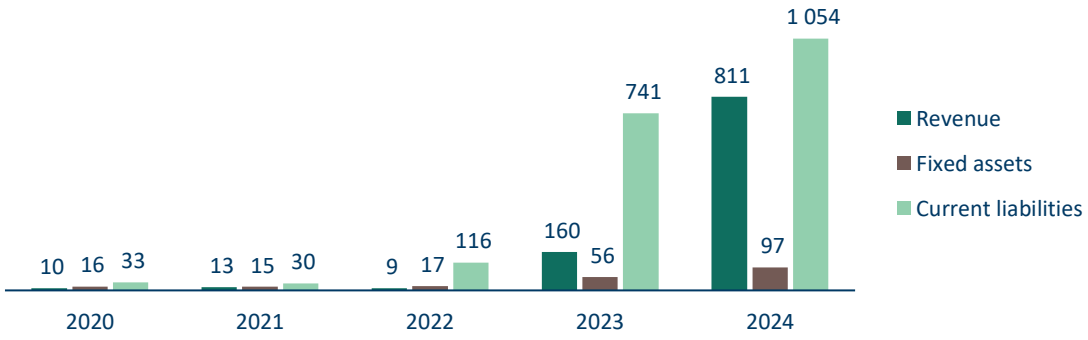



Source: KSE Institute

### Main financial indicators

In 2019–2024, financial results changed dramatically. In 2020–2021, revenue rose to €13 million, while liabilities and assets grew five to six times compared to baseline levels. The most dramatic shift occurred in 2022: revenue dropped to €9 million, but liabilities increased to €17 million and assets to €116 million. This was likely the result of investment in production capacity to meet defence-related demand, with delayed effects on output.

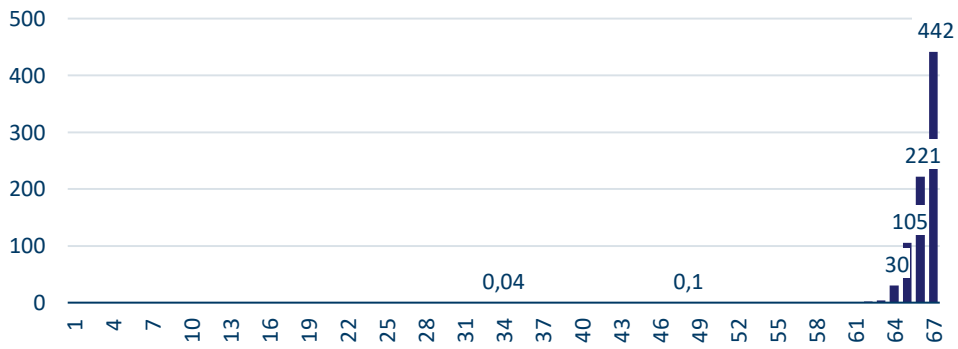
## FIGURE 31. MAIN FINANCIAL INDICATORS, € MILLION




Source: KSE Institute

Thanks to earlier investments, revenue in 2023 increased to €160 million and fixed assets exceeded €740 million. In 2024, the sector reached peak performance: revenue amounted to €811 million, liabilities rose to €97 million, and assets exceeded €1,054 million.

## FIGURE 32. PRODUCERS' REVENUE DISTRIBUTION, 2024, € MILLION




Source: KSE Institute

The revenue structure in 2024 reveals strong concentration. More than 300 companies declared sales below €0.2 million, while the largest producers generated most of the financial results. Ten key players accounted for about three quarters of revenue, indicating dominance of a small group of medium and large firms. This ensures competitive dynamics but also increases dependence on the strategic decisions of major companies.

## Manufacture and Repair of Aircraft, Including Spacecraft

In 2024, the Ukrainian sector of aircraft and spacecraft manufacturing and repair generated an estimated €492 million in output, accounting for around 9% of the total dual-use and components market. The sector's production volume in 2024 was 8% higher than in 2021. According to our estimates, 661 companies were active in the sector in 2024 — three times more than a year earlier. While revenues grew significantly, the growth pattern was wave-like, with a peak in 2021, a decline in 2022, and subsequent recovery through 2023–2024. Market concentration remains high, with the top company controlling 43% of total revenues.

In Ukraine, under code 30.30 and 33.13, the aerospace sector encompasses the production, repair, and modernization of aircraft, helicopters, UAVs, and spacecraft components. Key production areas include:

- Aircraft engines and power units – turboprop, turbojet, and piston engines for civilian and military aircraft, as well as components for unmanned platforms.
- Fixed-wing aircraft – serial production and modernization of transport, trainer, and light attack models.
- Unmanned aerial systems (UAS) – tactical and strategic UAVs, including reconnaissance and strike platforms with modern communication and navigation modules (described separately)
- Spacecraft components and avionics – control systems, sensors, and electronic units for research and applied programs.
- Repair and modernization – comprehensive maintenance of aircraft and UAS, integrating advanced navigation, communication, and control systems.

### General market size and structure

The analysis in this section covers manufacturers of aviation equipment and specialized components, including aircraft engines. The annual production volume of aircraft engines in Ukraine can be estimated as the total revenue of companies operating under CEA 30.30 and 33.13, excluding UAV producers (analysed separately). Due to incomplete reporting by the market leader, aggregate figures were adjusted by extrapolating the company's revenue.

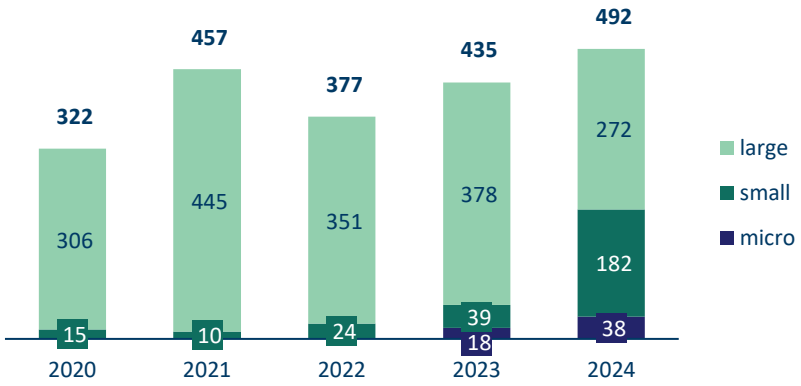
Foreign trade data is aggregated from open sources and the State Customs Service under the following codes:

- 8802 – Aircraft (other than helicopters) weighing more than 2000 kg
    - 8802.30 – Aircraft and other aircraft, weighing more than 15,000 kg
    - 8802.40 – Aircraft and other aircraft, weighing more than 2000 kg but not exceeding 15,000 kg
- 8803 – Parts of aircraft and helicopters
    - 8803.30 – Parts of aircraft and helicopters
- 8805 – Launchers, ground equipment for airfields, simulators
    - 8805.10 – Catapults and similar equipment
    - 8805.21 – Simulators for pilots

Between 2019 and 2024, the aircraft manufacturing segment demonstrated significant dynamics, with a shift in balance between large and smaller manufacturers. In 2019, the market was valued at €253 million, with

large companies generating more than 95% of revenues. After a moderate decline in 2022, production recovered, and in 2023–2024 revenues began to redistribute more broadly, and reaching €492 million in 2024. While large enterprises remained dominant, the growing role of small and microenterprises reflects the entry of new players and the expansion of niche segments focused on innovative or specialized developments.

## FIGURE 33. COMPANIES' REVENUE BY SIZE, € MILLION



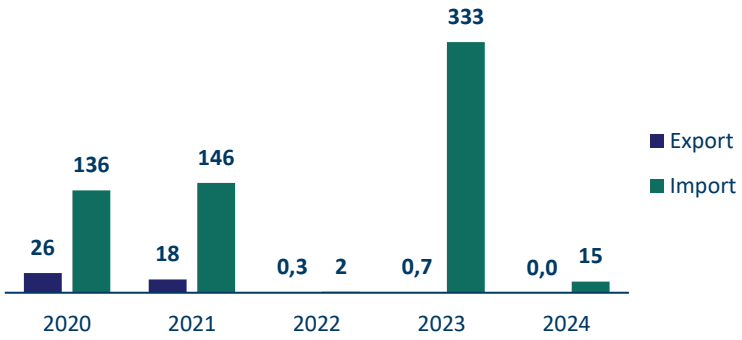

Source: KSE Institute

Thus, the market structure is gradually diversifying large producers continue to define total output, but their share is declining in favour of smaller, specialized firms, supporting more sustainable industry development.

### Growth potential (estimated capacity, trade data analysis, other considerations)

Between 2020 and 2024, aircraft production increased from €322 million to €492 million. Despite a decline in 2022, the sector recovered quickly, confirming strong and growing domestic demand.

## FIGURE 34. UKRAINIAN INTERNATIONAL TRADE, € MILLION



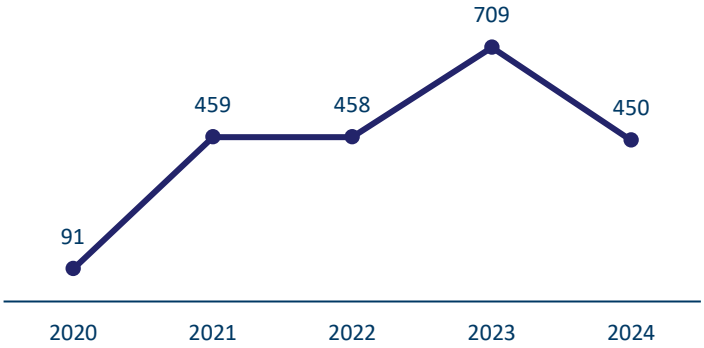

Source: KSE Institute

Imports fluctuated significantly, from €145.6 million in 2021 to a peak of €332.8 million in 2023. This volatility may partly reflect the introduction of a separate code for UAVs in Ukraine, which excluded them from the above statistics. Exports declined from €25.9 million in 2020 to almost zero in 2024, leading to a consistently negative trade balance and underlining dependence on external supplies.

Market capacity also fluctuated: from €90.9 million in 2020 to €708.9 million in 2023, before dropping to €450.1 million in 2024. This may reflect the fulfilment of prior purchase orders rather than ongoing demand.

Given these dynamics, growth potential lies primarily in strengthening domestic production and advancing import substitution. Developing export channels is essential for balancing the trade deficit. In the medium term, opportunities are tied to expanding domestic demand and gradually improving the international competitiveness of Ukrainian producers.

## FIGURE 35. MARKET CAPACITY, € MILLION

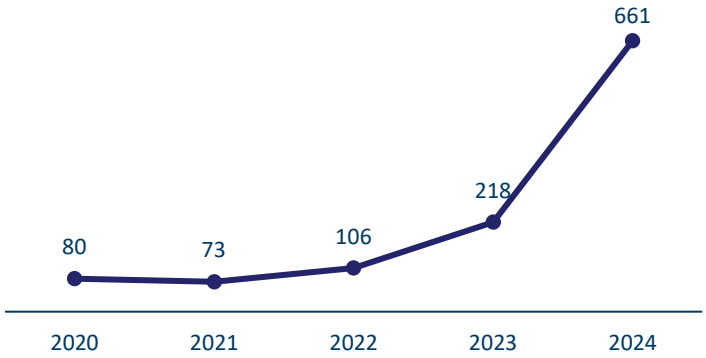



Source: KSE Institute

### Number of companies

The number of companies in the aircraft manufacturing segment has grown rapidly over the past five years. In 2020, 80 companies were active; by 2022, this rose to 106. The sharpest increase occurred in 2023–2024, when the number of participants surged from 218 to 661.

## FIGURE 36. NUMBER OF COMPANIES

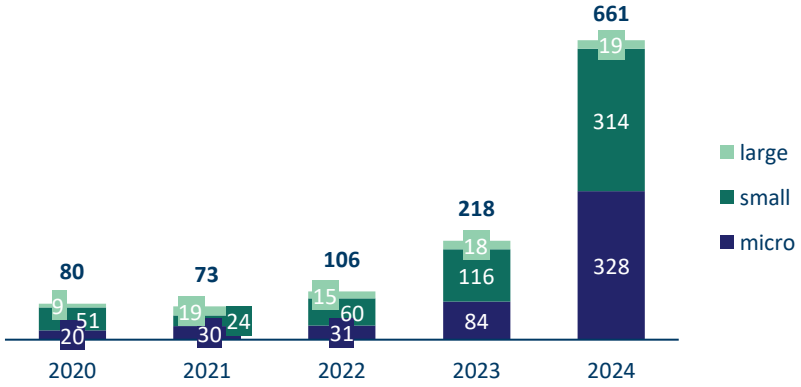



Source: KSE Institute

This rapid expansion reflects rising public and private interest in aircraft production and the entry of new enterprises, particularly small firms specializing in components and technologies. This signals diversification, structural expansion, and intensifying competition.

### Companies' size

## FIGURE 37. COMPANIES' QUANTITY BY SIZE

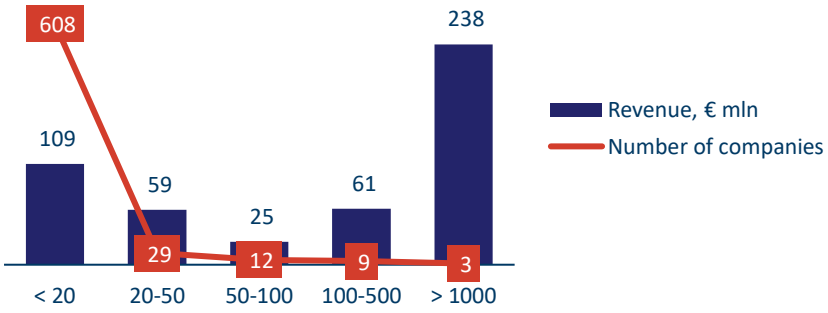



Source: KSE Institute

The structure of the market shifted markedly in 2020–2024. While small enterprises dominated in 2020 (51 out of 80), by 2024 microenterprises accounted for the largest share (328 out of 601). The number of large producers remained stable at 15–19, meaning their absolute presence did not grow in line with overall market expansion.

Revenue distribution by employment confirms high concentration among large players. In 2024, more than 600 firms with fewer than 20 employees generated only €108.9 million (less than one-quarter of the market). In contrast, three companies with more than 1,000 employees generated €238.5 million, or almost half of total revenue. Another nine companies with 100–500 employees generated €60.5 million.

## FIGURE 38. REVENUE BY COMPANIES' SIZE

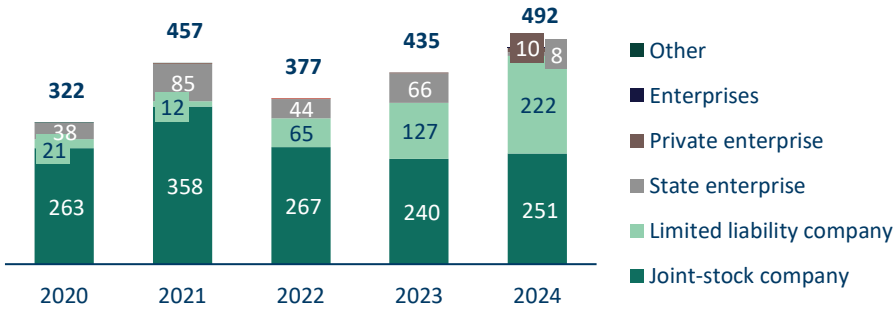



Source: KSE Institute

Thus, the market combines broad diversification from numerous small players with financial stability concentrated in a small group of large producers. This structure supports innovation at the small-enterprise level but leaves the industry financially dependent on large companies.

### Ownership structure

## FIGURE 39. OWNERSHIP STRUCTURE, € MILLION




Source: KSE Institute

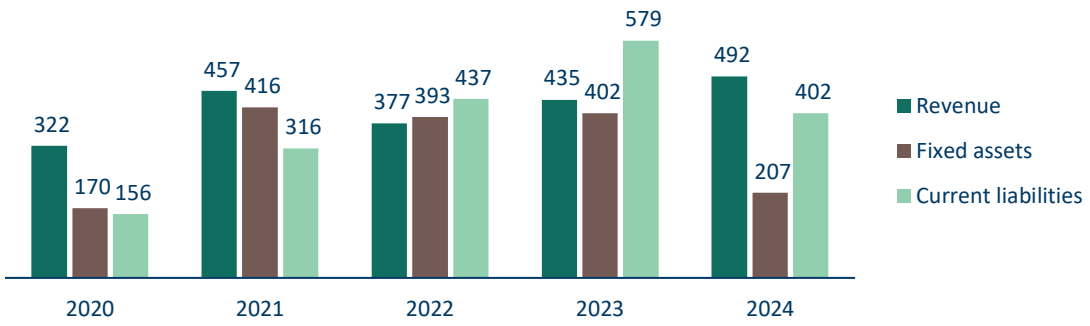
In 2019–2020, joint-stock companies dominated, generating over 80% of revenues (more than €230 million annually). State-owned enterprises played a secondary role. In 2021, diversification began: the share of state-owned enterprises increased, and in 2022 limited liability companies significantly strengthened their positions.

By 2024, LLCs and joint-stock companies were nearly equal in scale (over €220 million and €250 million respectively), while state-owned and private firms contributed marginally. Overall, the market shifted from heavy concentration in joint-stock companies to a more balanced ownership model, with LLCs gaining increasing influence.

### Main financial indicators

Between 2019 and 2024, financial performance showed growth with periodic fluctuations. Revenues nearly doubled, exceeding €492 million in 2024. However, growth followed a wave-like trend: a peak in 2021, a decline in 2022, and subsequent recovery in 2023–2024.

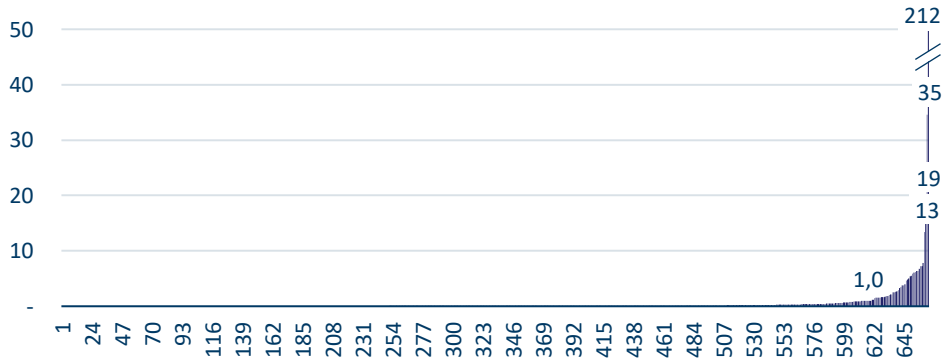
**FIGURE 40. MAIN FINANCIAL INDICATORS, € MILLION**




Source: KSE Institute

Fixed assets expanded significantly in 2021–2023, reflecting investment in production facilities. In 2024, this indicator declined, likely signalling the completion of the investment phase and commissioning of new facilities. Current liabilities rose faster than revenues, peaking in 2023 before a slight reduction in 2024, confirming active reliance on credit financing.

**FIGURE 41. PRODUCERS' REVENUE DISTRIBUTION, 2024, € MILLION**




Source: KSE Institute

Revenue concentration remained high in 2024: most firms reported less than €1 million in annual sales, while a limited number of large companies generated the majority of total revenue. The ten largest firms accounted for most of the market.

Thus, the sector is characterized by reliance on large players, cyclical investment patterns, and uneven short-term performance, despite long-term growth.

## Communication Equipment

In 2024, the Ukrainian communication equipment sector generated an estimated €379 million in output, accounting for around 7% of the total dual-use and components market. The sector's production volume in 2024 was six times higher than in 2021. According to our estimates, 157 companies were active in the sector in 2024 — 41% more than a year earlier. Medium-sized enterprises (100–500 employees) accounted

for 61% of total revenues. Limited liability companies generated 77% of total revenues, while state-owned enterprises contributed about 21%. Financial indicators reveal increased leverage: current liabilities in the sector grew even faster than revenues during the observed period, while a positive trend emerged in 2024. The top five companies captured 79% of total revenues, reflecting the sector's high market concentration.

Code 26.30 "Manufacture of communication equipment" covers equipment for transmitting data and signals via wired or wireless communication. It includes automatic telephone exchanges, telephones and fax machines, routers, modems, antennas, cable TV equipment, pagers, mobile data transmission devices, radio and TV transmitters, security and fire alarm systems, studio equipment for radio and TV, and satellite communication equipment. It does not include computers, consumer electronics, or TV receivers.

In Ukraine, under NACE 26.30, a wide range of communication equipment is produced, covering both civilian and dual-use applications. The leading enterprises focus on several key areas:

- Security and fire alarm systems – from basic sensors and control panels to complex integrated solutions for critical infrastructure.
- Radio communication and secure networks – portable and stationary radios, encrypted communication systems widely applied in both civilian and defence domains
- Navigation and specialized communication modules – satellite communication equipment, data transmission systems, and interface units for transport and defence industries
- Antennas and telecommunication infrastructure – various antenna systems, including those for mobile, satellite, and tactical use
- Routers, modems, and peripheral communication devices – solutions for secure data transfer and resilient network building
- Thus, Ukraine's production covers most of the essential segments of communication equipment, serving both commercial markets and defence needs.

## General market size and structure

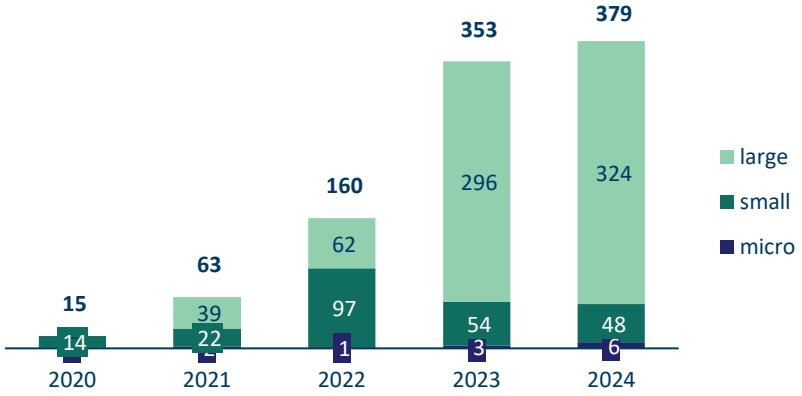
The annual production of communication equipment in Ukraine can be estimated as the total revenue of companies operating under CEA 26.30. Foreign trade data are aggregated from open sources and from the State Customs Service by the following codes:

- 8525 – Transmission equipment
    - 852510 – Transmitters for radio or television broadcasting
    - 852560 – Transmitting equipment for radar, radio navigation, radio control
- 8526 – Radar, radio navigation, and remote control equipment
    - 852610 – Radar equipment
    - 852691 – Radio navigation equipment
    - 852692 – Remote control equipment
- 8529 – Parts suitable for use with equipment 8525–8528

Production of communication equipment, measured by revenue, grew steadily in 2020–2024. The lowest level was recorded in 2020 (€15.5 million), reflecting the impact of the COVID-19 pandemic and a decline in investment activity. Recovery began in 2021 (€62.9 million), and in 2022 output reached €160.4 million. Growth continued in subsequent years, with production amounting to €378.7 million in 2024. However, growth rates slowed in 2023–2024, when output stabilized at €350–370 million.

Over the past five years, production has increased 24.5 times, driven by strong demand in the defence sector and the expansion of related industries. In 2024, most production came from large enterprises.

## FIGURE 42. COMPANIES' REVENUE BY SIZE, € MILLION

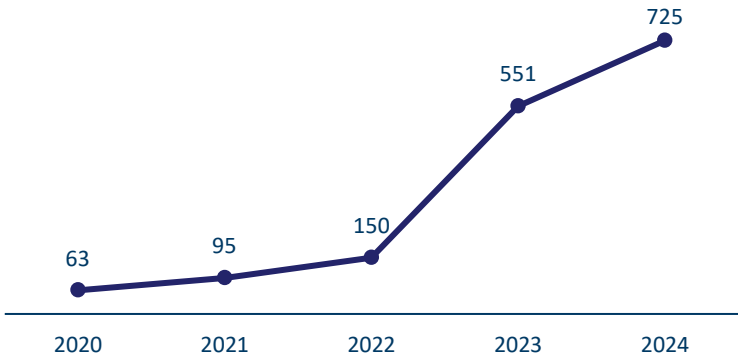



Source: KSE Institute

### Growth potential (estimated capacity, trade data analysis, other considerations)

The capacity of the Ukrainian communications equipment market, calculated as *production + imports – exports*, amounted to approximately €674 million in 2024, compared with €51.6 million in 2020, representing a thirteen-fold increase over five years. Before the full-scale invasion, the market structure was dominated by imports; since 2022, domestic production has expanded rapidly and now slightly exceeds imports. In 2024, domestic production totalled €378.7 million, while imports amounted to €357.2 million.

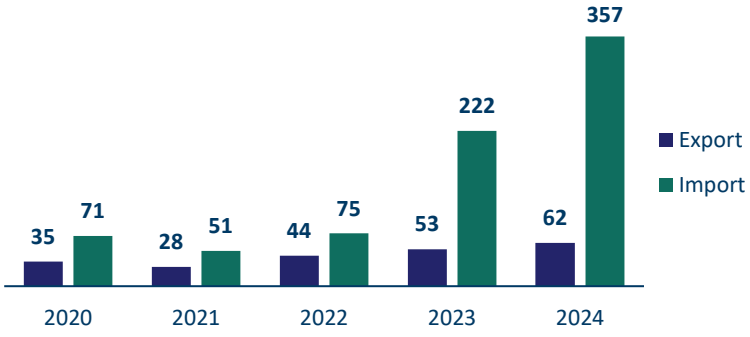
## FIGURE 43. MARKET CAPACITY, € MILLION




Source: KSE Institute

Exports in this product group remain relatively stable and low, whereas imports have grown fivefold since 2020. The trade deficit persisted throughout the period, amounting to –€412.6 million in 2020 and –€365.2 million in 2024. This highlights the sector's continued dependence on imports, though the rise of domestic production has partially offset the imbalance.

## FIGURE 44. UKRAINIAN INTERNATIONAL TRADE, € MILLION



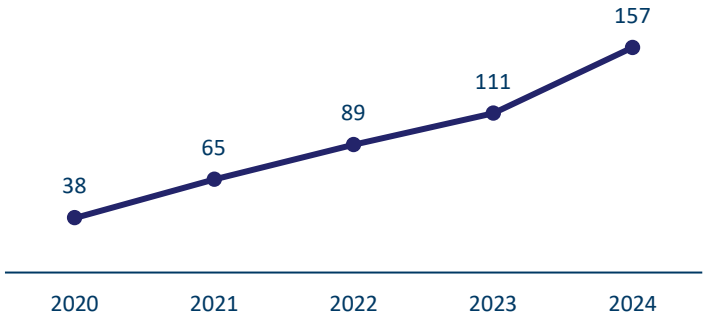

Source: KSE Institute

Demand for communications equipment remains consistently high, with imports ranging between €300–500 million annually. This demonstrates considerable room for further development of local production. However, the slowdown in growth since 2023 requires closer analysis: if the stabilization reflects saturation in certain segments, future development will depend on investment in new production lines rather than expansion of existing facilities.

## Number of companies

The number of companies in the communications equipment manufacturing segment grew from 38 in 2020 to 157 in 2024. The most dynamic expansion occurred in 2022–2024, when the number of participants almost doubled (from 89 to 157). This indicates rapid sectoral development and the entry of new producers and suppliers.

### FIGURE 45. NUMBER OF COMPANIES

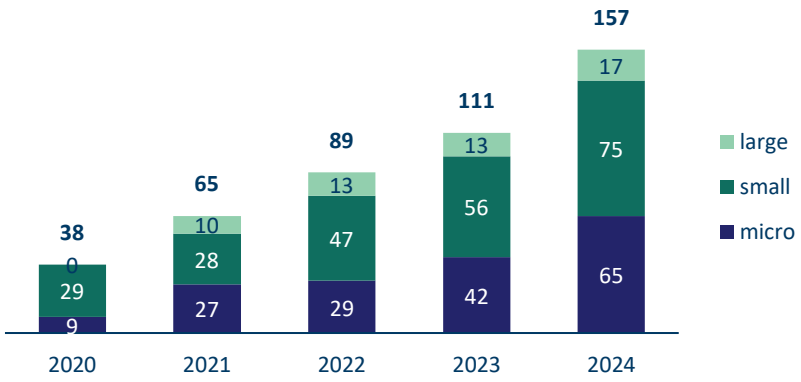



Source: KSE Institute

## Companies' size

As of 2024, the segment is dominated by small enterprises, accounting for 75 of 157 companies. At the same time, the number of microenterprises has grown significantly, from just 9 in 2020 to 65 in 2024. The number of large enterprises also increased, from 10 in 2021 to 17 in 2024.

### FIGURE 46. COMPANIES' QUANTITY BY SIZE

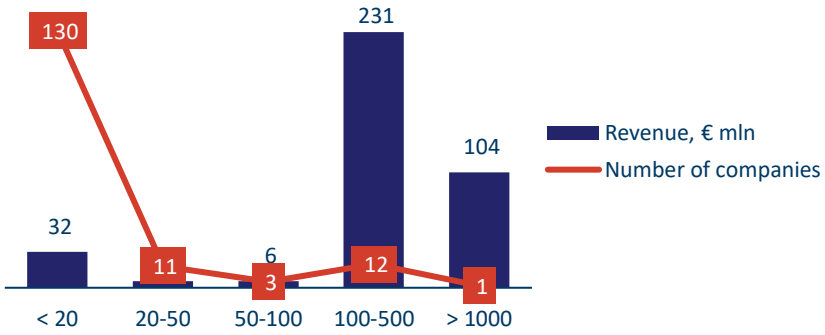



Source: KSE Institute

An analysis of revenues and company size shows that the bulk of financial results is generated by a relatively small group of medium and large enterprises. In 2024, large companies employing 100–500 staff accounted for 61% of total market revenue (€230.8 million out of €378.7 million). Meanwhile, 136 micro and small enterprises with fewer than 50 employees generated only €38.3 million in total.

Thus, most companies operate in the low-revenue segment, creating conditions for potential consolidation and for strengthening the role of medium-sized producers capable of attracting investment and establishing sustainable production and export flows.

**FIGURE 47. REVENUE BY COMPANIES' SIZE**

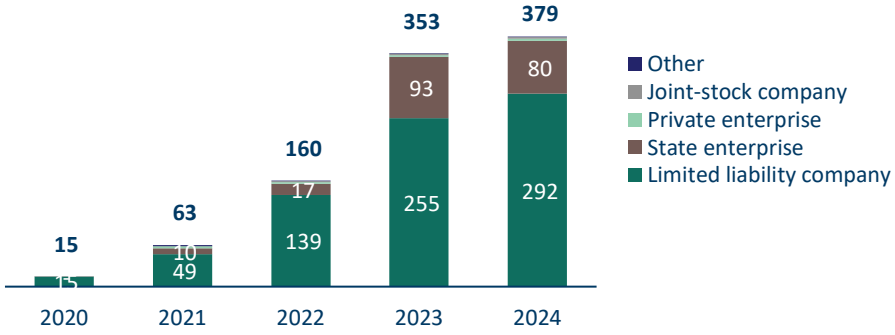



Source: KSE Institute

## Ownership structure

The ownership structure of communications equipment producers is dominated by limited liability companies (LLCs). In 2020–2024, LLCs consistently accounted for the largest share of revenue. In 2024, their revenue reached €292 million, or more than three-quarters of the total. Companies of state ownership hold only marginal shares.

**FIGURE 48. OWNERSHIP STRUCTURE, € MILLION**




Source: KSE Institute

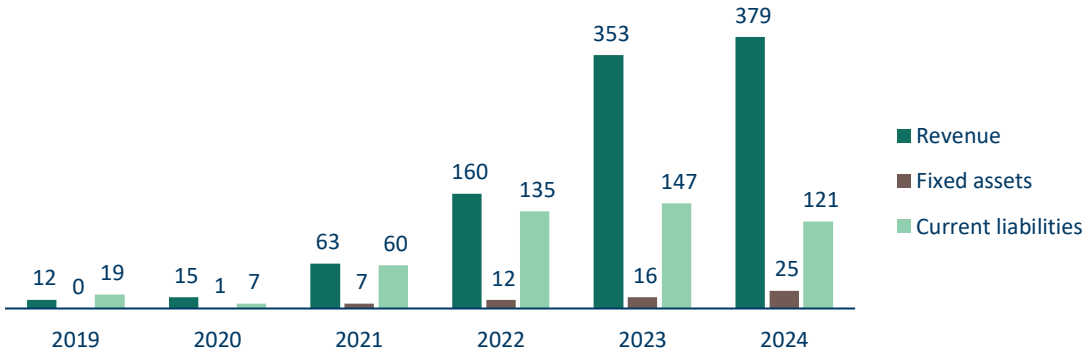
## Main financial indicators

From 2020 to 2024, the financial performance of companies showed a strong upward trend. Revenue increased from €15.5 million in 2020 to €378.7 million in 2024. The sharpest growth occurred in 2023–2024, when revenue tripled compared to 2022. This reflects rapid business expansion and the sector's entry into a phase of large-scale growth, primarily driven by high demand.

Property, plant, and equipment also grew, indicating a gradual increase in investment in long-term assets. While in 2020 the level was only €0.90 million, in 2023 it rose to €16 million, and in 2024 it reached €24.7 million. Such indicators indicate that companies are expanding their production capacities and modernizing their infrastructure in anticipation of the industry's steady growth.

Current liabilities grew even more markedly, from €7.05 million in 2020 to €121.1 million in 2024, but peaked in 2023 at €146.8 million. This may indicate an expansion of business activity, but it also highlights the growing dependence on short-term financing.

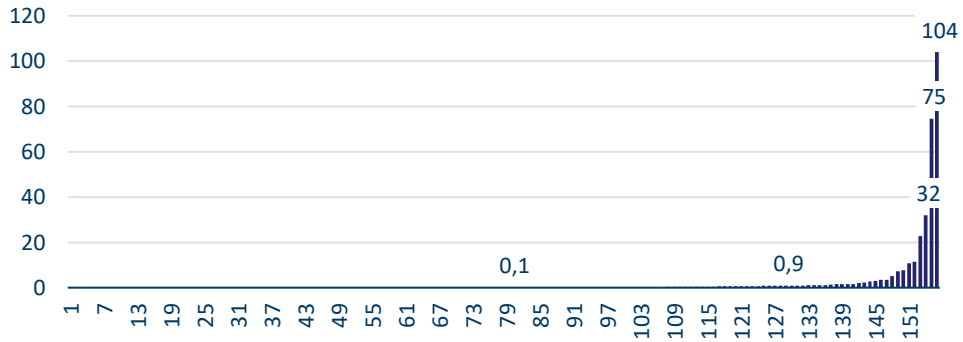
## FIGURE 49. MAIN FINANCIAL INDICATORS, € MILLION




Source: KSE Institute

Revenue distribution in 2024 was highly concentrated. The majority of companies reported modest results: more than 110 companies generated less than €0.2 million each. The five largest firms accounted for the majority of total revenue, while about 10% of participants generated nearly 80% of the market's revenue. This demonstrates strong inequality in performance and high market concentration, which may encourage M&A activity or lead to the gradual exit of less competitive players.

## FIGURE 50. PRODUCERS' REVENUE DISTRIBUTION, 2024, € MILLION




Source: KSE Institute

## Navigation, Sensors and Measuring Instruments

In 2024, the Ukrainian sector of navigation, sensors, and measuring instruments generated an estimated €214 million in output, accounting for about 4% of the total dual-use and components market. The sector's production volume in 2024 was 62% higher than in 2021, reflecting gradual but steady growth. According to our estimates, 341 companies were active in the sector in 2024 — 7% more than a year earlier. The ownership structure is diversified, including limited liability, private, and joint-stock companies. Current liabilities increased broadly in line with revenues, suggesting balanced financial expansion. The top five companies accounted for 53% of total revenues, indicating a moderate level of market concentration.

Under code 26.51 "Manufacture of instruments and appliances for measuring, testing, and navigation," Ukraine has developed a notable segment of high-technology products for both civilian and defence markets. Leading enterprises focus on the following areas:

- Radar and navigation systems – solutions for aviation and air defence, including airborne radar stations and navigation equipment.
- Industrial and critical automation systems – digital control complexes for energy and infrastructure facilities with monitoring and safety functions.

- Radiation monitoring instruments – portable and stationary dosimeters, spectrometers, and monitoring systems for the environment and critical infrastructure.
- Measuring and testing equipment – devices for calibration and measurement of electrical and physical parameters, including multifunctional laboratory systems.
- Sensors and modules – from industrial sensors to specialized solutions for transport, energy, and defence applications.

Thus, Ukraine's production under 26.51 covers both precision instruments for science and industry and specialized dual-use systems.

## General market size and structure

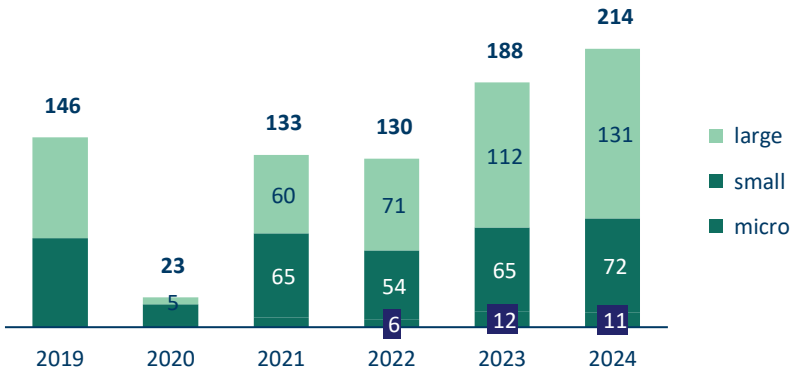
The annual production volume of navigation and sensor devices in Ukraine can be estimated as the total revenue of companies operating under CEA 26.51. Data on foreign trade is aggregated from open sources and the State Customs Service by codes:

- 901320 Laser devices (except laser diodes 8541)
- 901420 Instruments and appliances for aviation or space navigation
- 901580 Other geodetic instruments (including for aerial photography)
- 903180 Other measuring and controlling instruments
- 903190 Parts for measuring instruments
- 901390 Parts for laser and other optical instruments

The production volume of navigation and measuring instruments under CEA 26.51 showed fluctuating dynamics during 2019–2024 due to successive crises. In 2019, production amounted to €146.2 million, serving as the pre-crisis benchmark. In 2020, output fell sharply to €22.9 million, largely due to the impact of the COVID-19 pandemic.

In 2021, the sector recovered rapidly to €132.6 million, while in 2022 a slight decline was observed following the onset of the full-scale invasion. From 2023 onwards, the industry returned to growth: from €129.8 million in 2022 to €214.3 million in 2024. The market structure demonstrates a gradual strengthening of large producers: their share increased from €5.4 million in 2020 to €130.6 million in 2024.

**FIGURE 51. COMPANIES' REVENUE BY SIZE, € MILLION**



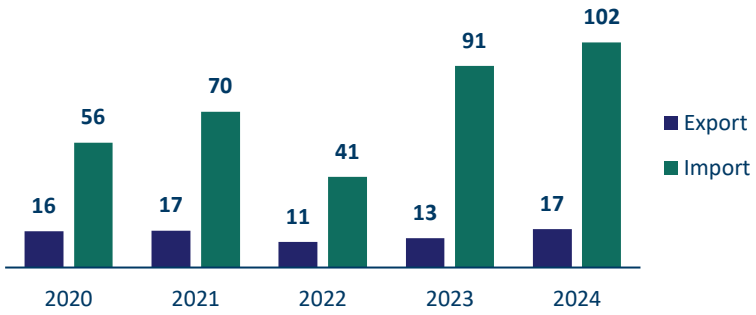

Source: KSE Institute

Thus, over the past five years, the market experienced a significant decline in 2020 but recovered quickly, reaching volumes in 2024 almost 7.5 times higher than in the crisis year. This points to restored demand and consolidation of the main players.

## Growth potential (estimated capacity, trade data analysis, other considerations)

The market structure under CEA 26.51 remains strongly dependent on imports. Between 2020 and 2024, imports grew markedly, from €56.3 million to €101.5 million, reflecting rising demand for specialized devices. Exports remained consistently low, fluctuating between €11 million and €17.5 million annually.

### FIGURE 52. UKRAINIAN INTERNATIONAL TRADE, € MILLION

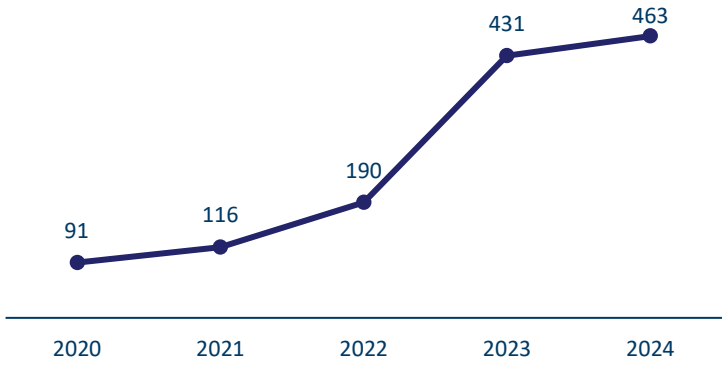



Source: KSE Institute

The trade balance stayed negative throughout the period, ranging from €29.4 million in 2022 to €84.2 million in 2024. This confirms the structural gap between imports and exports and the reliance of the domestic market on foreign supplies. At the same time, domestic production showed a positive trajectory.

Demand for products remains stable, with imports continuing to rise despite similar growth in production volumes. This indicates potential for further import substitution. An additional growth factor is the defence and dual-use focus of enterprises, which encourages greater investment in production.

### FIGURE 53. MARKET CAPACITY, € MILLION



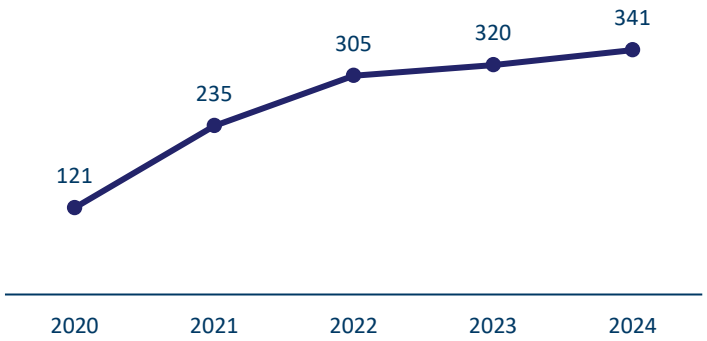

Source: KSE Institute

Therefore, the market holds significant potential for further expansion. Strengthening domestic production and gradually reducing import dependence will require both modernization of existing facilities and attraction of additional capital to establish new production clusters.

## Number of companies

The sector nearly tripled in size: from 121 companies in 2020 to 341 in 2024. Growth was particularly intense in 2020–2022, when the number of participants more than doubled (from 121 to 305). In 2022–2024, growth slowed but continued, with an additional 12% increase (from 305 to 341). This indicates gradual market saturation, where new entrants appear more cautiously and competition shifts toward quality and specialization.

## FIGURE 54. NUMBER OF COMPANIES

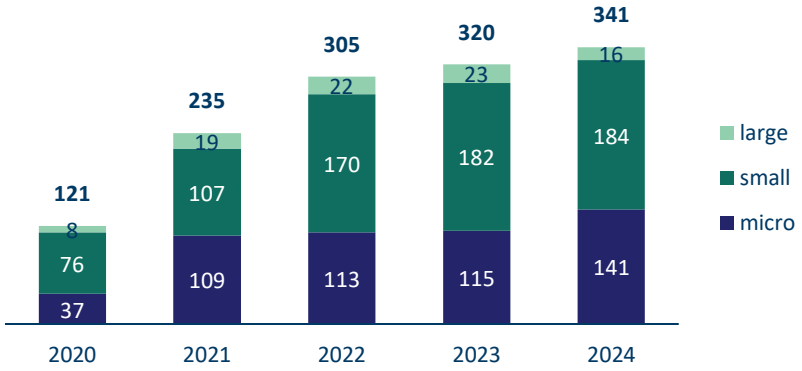



Source: KSE Institute

### Companies' size

As of 2024, small enterprises dominate the production of measuring and navigation devices, with 184 out of 341 companies. At the same time, the number of microenterprises increased rapidly: from 37 in 2020 to 141 in 2024, reflecting low entry barriers and intensifying competition.

## FIGURE 55. COMPANIES' QUANTITY BY SIZE

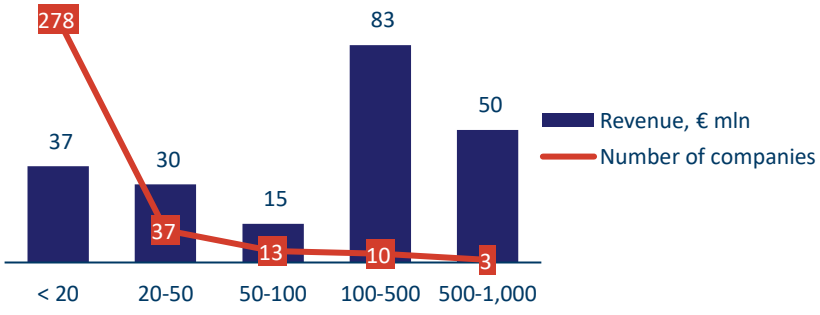



Source: KSE Institute

Large enterprises also grew in number, from 8 in 2020 to 23 in 2023. Although they account for only about 5% of all companies, they play a key role in the financial structure of the industry.

In 2024, companies with more than 100 employees accounted for 62% of total sector revenues. At the same time, 278 firms — representing 82% of all companies — employed fewer than 20 people and generated only 17% of total revenues, highlighting the dominance of larger enterprises in overall market performance.

## FIGURE 56. REVENUE BY COMPANIES' SIZE

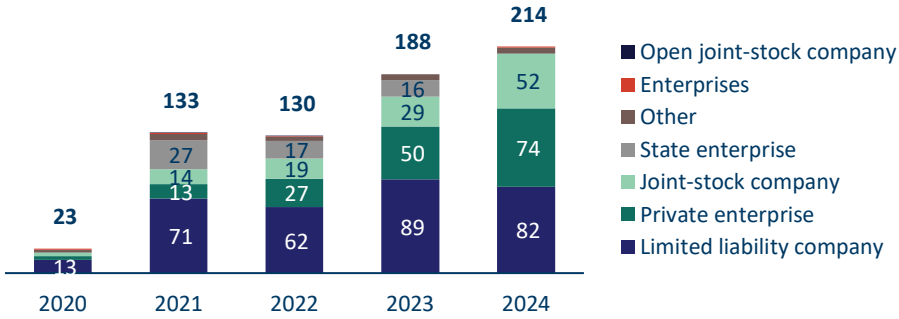



Source: KSE Institute

## Ownership structure

The ownership structure of companies in this segment is dominated by limited liability companies (LLCs). From 2020 to 2024, they consistently generated the largest share of revenues. In 2024, LLCs accounted for €81.97 million. Together with private companies (€73.9 million), these forms generated over 70% of industry revenue.

### FIGURE 57. OWNERSHIP STRUCTURE, € MILLION

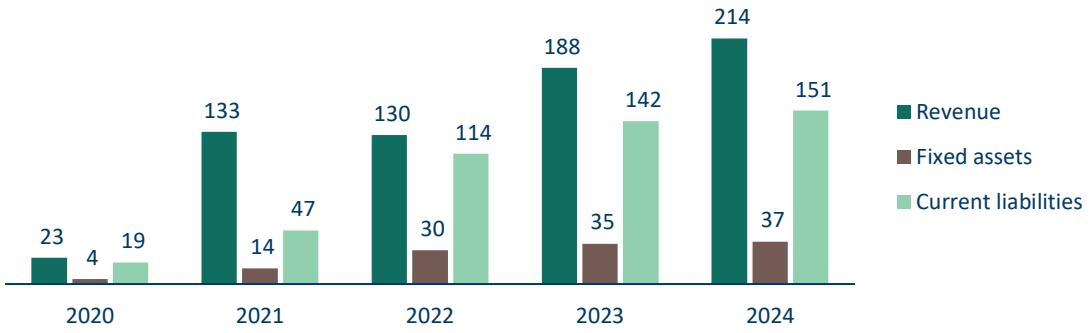



Source: KSE Institute

Other ownership forms had limited influence. In 2024, state-owned enterprises accounted for only €0.02 million, confirming the minimal role of the state. The situation was similar in previous years.

## Main financial indicators

### FIGURE 58. MAIN FINANCIAL INDICATORS, € MILLION




Source: KSE Institute

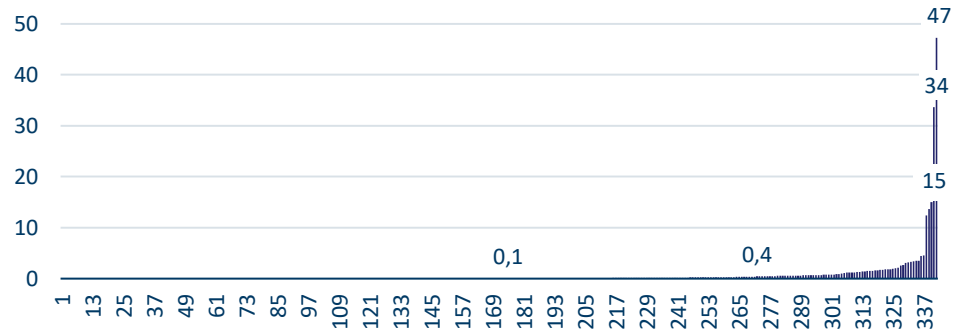
Between 2020 and 2024, the financial results of companies in the segment improved steadily. Revenue rose from €22.9 million in 2020 to €214.3 million in 2024. The sharpest growth occurred in 2020–2021 (almost sixfold, from €22.9 million to €132.6 million) and in 2022–2023 (+45% after a temporary stagnation). This reflects the sector's sensitivity to demand fluctuations and rapid adaptation of producers.

Fixed assets also grew significantly: from €4.5 million in 2020 to €37.1 million in 2024, with €35.2 million already reached in 2023. This demonstrates active modernization and adoption of new technologies. Current liabilities increased from €18.96 million in 2020 to €151.1 million in 2024, highlighting expanded business activity, greater reliance on credit financing, and optimistic expectations for future development.

Revenue distribution is highly concentrated. In 2024, over 200 companies had revenues below €0.2 million, while the top 10 firms controlled about 60% of turnover. This illustrates the dual structure of the sector: on one hand, many small companies drive competition and market diversity, while on the other, financial results

are concentrated among a narrow group of medium and large enterprises. This structure may serve as the basis for future consolidation and partial monopolization.

**FIGURE 59. PRODUCERS' REVENUE DISTRIBUTION, 2024, € MILLION**




Source: KSE Institute

## Optical Instruments and Photographic Equipment

In 2024, the Ukrainian sector of optical instruments and photographic equipment generated an estimated €176 million in output, accounting for around 3% of the total dual-use and components market. The sector's production volume in 2024 was 2.6 times higher than in 2021, though it declined by 5% compared with 2023, indicating a temporary slowdown after a period of rapid expansion. According to our estimates, 381 companies were active in the sector in 2024 — 11% more than a year earlier. Limited liability companies accounted for 80% of total revenues. Current liabilities grew proportionally to revenues, suggesting stable financial dynamics. The market shows moderate concentration, with the top five companies generating 55% of total revenues.

### General market size and structure

In Ukraine, under code 26.70 "Manufacture of optical instruments and photographic equipment," several enterprises operate across both civilian and defence markets. The main production areas include:

- Optoelectronic observation systems – thermal imaging cameras, night vision devices, and multispectral systems for military and civilian use.
- Aiming and navigation systems – optical and thermal sights, laser rangefinders, and modules integrated into armoured vehicles and UAVs.
- Photographic equipment and components – lenses, sensors, and optical units for professional photo and video technology, including customized solutions for specialized tasks.
- High-precision optics – lenses, prisms, filters, and other elements for scientific, medical, and industrial applications.
- Satellite and telecommunication observation systems – specialized optical modules for space and defence programs.

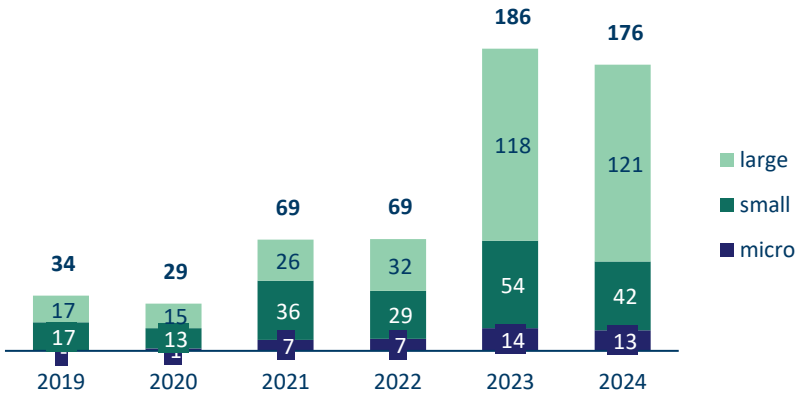
Thus, Ukraine's production in 26.70 covers the full spectrum from basic optical components to complex dual-use instruments integrated into modern military and civilian systems.

The annual production volume of optical devices and photographic equipment in Ukraine can be estimated as the total revenue of companies operating under CEA 26.70. Data on foreign trade is aggregated from open sources and the State Customs Service by codes:

- 901310 Telescopic sights for mounting on weapons; periscopes; optical tubes, manufactured as parts for machines, instruments, apparatus or devices
- 901390 Spare parts
- 901420 Devices and instruments for air navigation or space navigation
- 901490 Spare parts
- 900510 Binoculars
- 900580 Other optical instruments

In 2019–2024, the optical equipment production and repair segment was characterized by uneven but overall positive dynamics. In 2019, production volume reached €28.4 million, which serves as the baseline for further analysis. Neither the COVID-19 crisis nor the start of the full-scale invasion had a critical negative impact on the market. In 2019–2022, companies' revenues increased gradually, while in 2023 the sector demonstrated a rapid surge: revenue almost tripled to €186.1 million. The main driver of this growth was large enterprises, which generated over 60% of the total (€118 million).

**FIGURE 60. COMPANIES' REVENUE BY SIZE, € MILLION**




Source: KSE Institute

In 2024, the market adjusted slightly downward, with total net revenue amounting to €176.2 million. This decline suggests partial saturation following peak growth, yet production levels remained consistently high compared to 2019. Over five years, the segment grew almost sixfold (from €34 million in 2019 to €176.2 million in 2024). The key growth factors included increased demand in defence technologies, rising requirements for high-precision measurement systems, and the expansion of related dual-use markets.

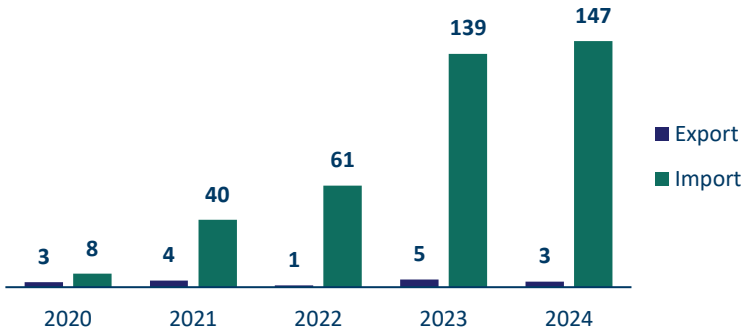
## Growth potential (estimated capacity, trade data analysis, other considerations)

The Ukrainian optical equipment production and repair market over the past five years has been marked by simultaneous growth in domestic output and stable dependence on imports. This dual trend points to expanding demand, particularly after the onset of the full-scale invasion.

Imports increased steadily: from €7.98 million in 2020 to €146.68 million in 2024. Exports, however, remained persistently low, fluctuating between €1.1 million and €4.6 million annually. As a result, the trade balance was consistently negative, with the deficit widening from €4.9 million in 2020 to €143.35 million in 2024.

Domestic market capacity, calculated as production + imports – exports, grew nearly ninefold over the period, from €34.0 million in 2020 to €309.7 million in 2024. This confirms the existence of significant demand, much of which is still satisfied by imports.

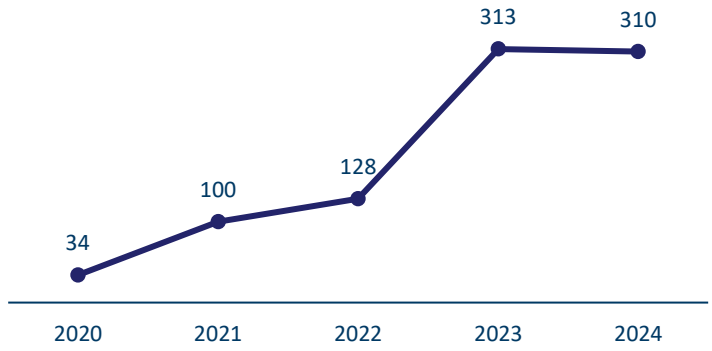
## FIGURE 61. UKRAINIAN INTERNATIONAL TRADE, € MILLION




Source: KSE Institute

Demand is driven by both civilian applications (medicine, engineering, telecommunications) and defence, where optical and optoelectronic technologies are of strategic importance. Consequently, the segment demonstrates strong growth potential, with expansion of domestic production essential to increase exports and gradually reduce import dependence.

## FIGURE 62. MARKET CAPACITY, € MILLION

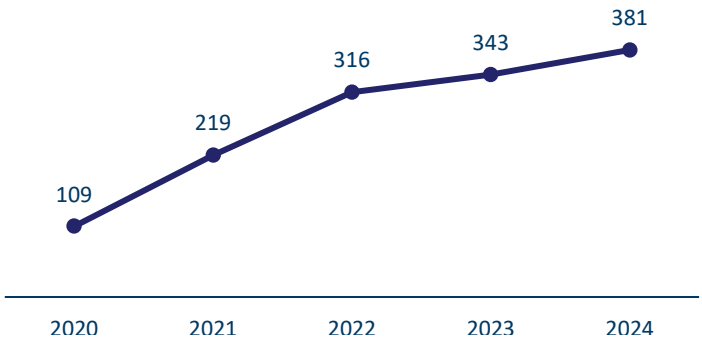



Source: KSE Institute

### Number of companies

The number of companies in the optical equipment manufacturing and repair segment expanded steadily between 2020 and 2024. Over this period, their total more than tripled, rising from 109 in 2020 to 381 in 2024.

## FIGURE 63. NUMBER OF COMPANIES




Source: KSE Institute

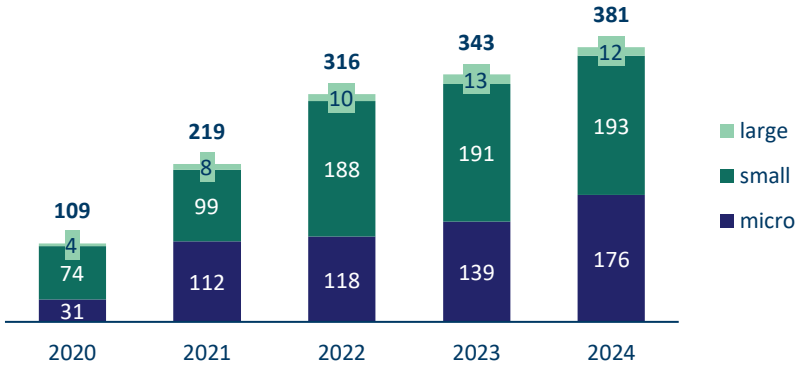
The most intensive growth occurred in 2020–2022, when the number of companies nearly tripled (from 109 to 316). In 2023–2024, growth slowed, with the number of market participants increasing by 20% (from 316 to

381). This suggests gradual market saturation. Nevertheless, the overall expansion illustrates strong investor interest and willingness to enter the segment.

## Companies' size

As of 2024, the segment was dominated by micro and small enterprises. Out of 381 companies, 176 were micro and 193 were small. Over five years, the number of micro enterprises grew more than fivefold (from 31 in 2020 to 176 in 2024), reflecting low entry barriers and the attractiveness of the segment for new players.

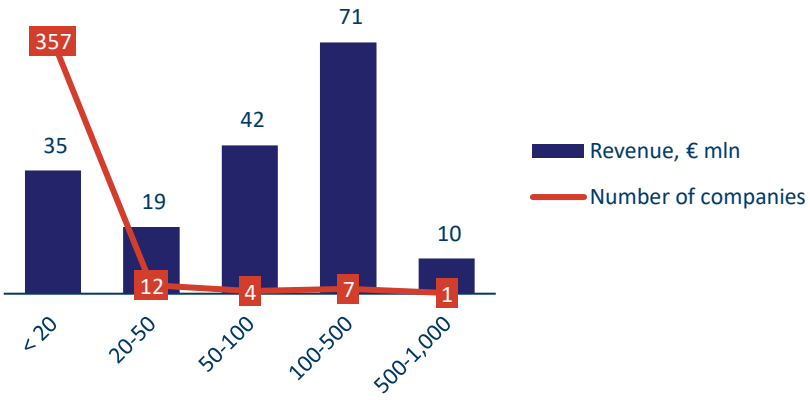
### FIGURE 64. COMPANIES' QUANTITY BY SIZE




Source: KSE Institute

The number of large enterprises remained limited, with only 7 companies in 2024. Despite their small share in terms of quantity, they formed the financial backbone of the sector. According to the 2024 revenue structure, 94% of companies accounted for less than 20% of total annual revenue, while 7 medium and large enterprises (100–500 employees) generated almost 42% of the sector's income (€70.9 million). This underlines their strategic role in shaping the market.

### FIGURE 65. REVENUE BY COMPANIES' SIZE



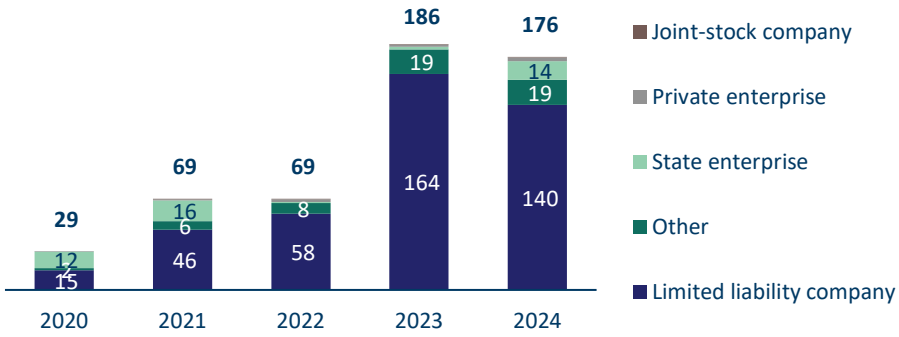

Source: KSE Institute

## Ownership structure

Limited liability companies (LLCs) dominate the optical equipment manufacturing and repair segment. In 2020–2024, they consistently provided the largest share of industry revenues. In 2024, LLCs accounted for €140.15 million, or more than 84% of total revenues. Private enterprises also played an important role,

generating €18.91 million in 2024, while other organizational forms contributed €2.8 million. Together, these categories represented around 13% of the sector's income.

## FIGURE 66. OWNERSHIP STRUCTURE, € MILLION



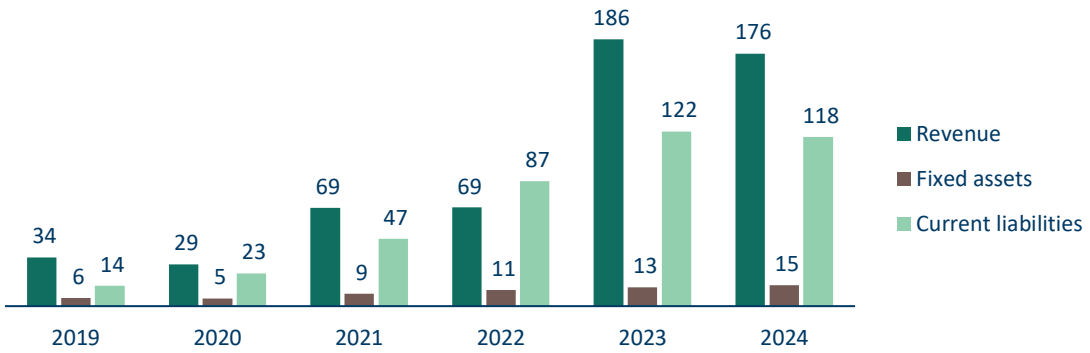

Source: KSE Institute

State-owned companies and joint-stock companies remained marginal. In 2024, state-owned enterprises generated only €14.1 million, while joint-stock companies contributed just €0.26 million. Thus, the ownership structure confirms the predominance of the private sector and the limited role of the state in shaping industry dynamics.

### Main financial indicators

In 2020–2024, the financial results of companies in the optical equipment manufacturing and repair segment fluctuated but overall demonstrated growth. Revenue rose from €29.16 million in 2020 to a peak of €186.2 million in 2023, before slightly declining to €176.2 million in 2024. The sharpest growth was observed in 2021–2023, when revenue nearly tripled and current liabilities increased by 2.7 times. The value of fixed assets almost doubled, from €5.43 million in 2020 to €14.6 million in 2024. The moderate decline in 2024 may signal partial market saturation or intensifying competition among leading players. Growth in current liabilities reflects expanding business activity and greater reliance on credit financing.

## FIGURE 67. MAIN FINANCIAL INDICATORS, € MILLION

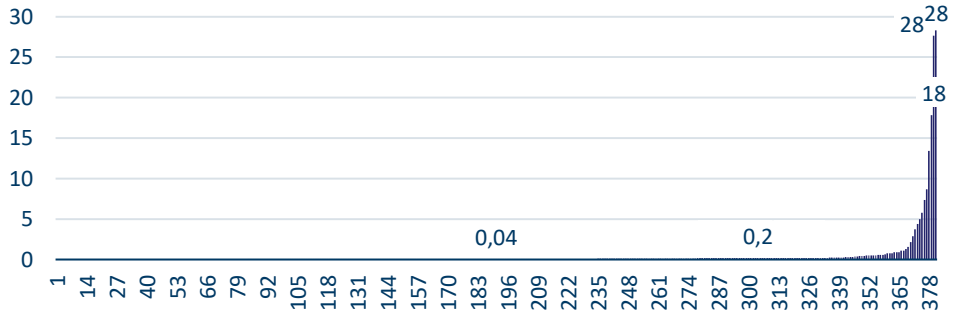



Source: KSE Institute

The 2024 revenue structure confirms high concentration. More than 300 companies reported annual volumes below €0.2 million, while the main financial results were generated by the largest players. Ten leading companies accounted for nearly 75% of sector revenue.

Overall, the segment is characterized by a large number of small companies that provide competition and market dynamics, while financial results are highly concentrated among a limited number of medium and large enterprises.

**FIGURE 68. PRODUCERS' REVENUE DISTRIBUTION, 2024, € MILLION**




Source: KSE Institute

## Electronic Components and Printed Circuit Boards (PCBs)

In 2024, the Ukrainian sector of electronic components and printed circuit boards generated an estimated €67 million in output, accounting for about 1% of the total dual-use and components market. The sector's production volume in 2024 was 4.4 times higher than in 2021, reflecting steady growth and increasing localization of electronics manufacturing. According to our estimates, 144 companies were active in the sector in 2024 — 22% more than a year earlier. 89% of companies employ fewer than 20 people, generating 24% of total revenues in 2024. Nearly all firms operate as limited liability companies, with fewer than 5% under other ownership forms. Revenues grew more strongly than current liabilities, indicating improved financial efficiency. The top five companies accounted for 67% of total revenues.

By 2025, Ukraine produces single- and double-layer printed circuit boards for consumer electronics, multilayer boards for telecommunications, medical, and military systems, as well as rigid-flex and flexible boards for mobile and wearable devices. High-precision multilayer boards are manufactured with copper layers, selective soldering, ENIG coating, and laser-drilled vias. In addition to standard components, boards are produced for power supply, controllers, sensor modules, RF modules, and communication interfaces. These technologies ensure compatibility with modern electronic systems and enable use in military and mission-critical equipment.

### General market size and structure.

Annual production of printed circuit boards and electronic components in Ukraine can be estimated as the total revenue of companies operating under KVED 26.11 and 26.12. Foreign trade data were aggregated from open sources and SCSU statistics using the following codes:

- 8534 – Printed circuit boards (printed circuits),
- 8541 – Semiconductor devices: diodes, transistors, photosensitive elements, LEDs,
- 8542 – Integrated circuits and microcircuits,

Production, measured by revenue, has been unstable over the past six years, with a pronounced downturn in 2020, most likely linked to the COVID-19 pandemic. This was followed by a recovery in 2021 and steady growth during 2022–2024. The peak level was reached in 2024 at €66.9 million. Most production in 2024 was generated by small and micro enterprises.

### Growth potential (estimated capacity, trade data analysis, other considerations)

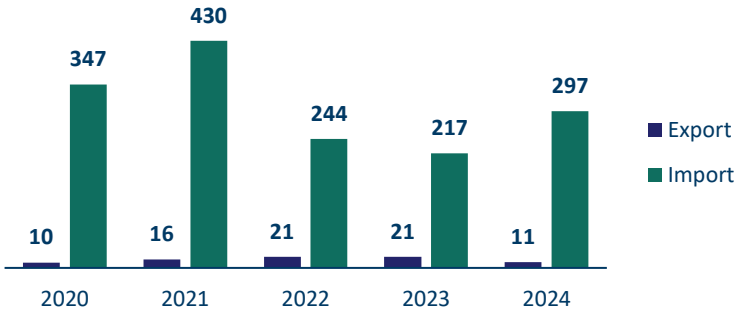
The capacity of the Ukrainian market for electronic components and printed circuit boards, calculated using the formula production + imports – exports, reached approximately €352 million in 2024. Imports have

dominated the market structure throughout the period under review, with the volume of foreign trade in this product group substantially exceeding domestic production.

The trade deficit has remained consistently high, reflecting the industry's reliance on imports. The foreign trade balance for printed circuit boards and electronic components amounted to –€337.45 million in 2020 and –€285.7 million in 2024. At the same time, the share of exports in total operations has remained persistently low.

Currently, the domestic market is far from saturated with locally produced goods. However, compared to the pre-crisis level of 2019, production had increased by 33% by 2024.

### FIGURE 69. UKRAINIAN INTERNATIONAL TRADE, € MILLION




Source: KSE Institute

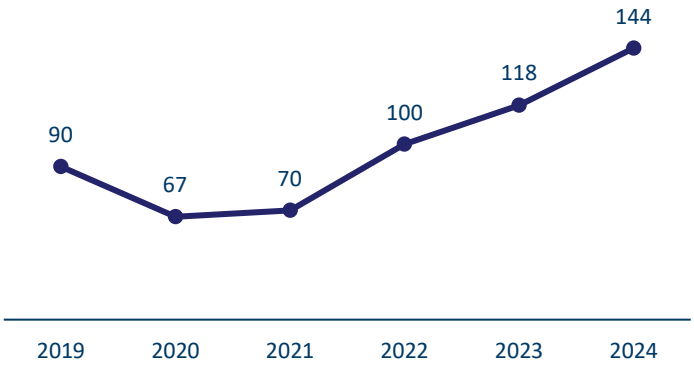
Import volumes have remained in the range of €250–500 million annually, reflecting strong demand and significant potential for expanding the domestic production base. In view of these trends, the market potential is assessed as high, with scope for further scaling up production.

The development of this segment depends on:

- Greater localization of production,
- Sustained demand driven by import dependence,
- Access to foreign markets through a stable, albeit limited, export channel,

## Number of companies

### FIGURE 70. NUMBER OF COMPANIES




Source: KSE Institute

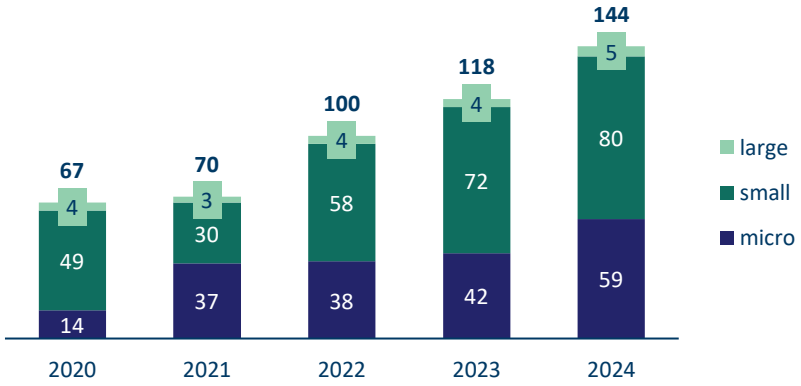
The number of companies engaged in the production and trade of dual-use goods has shown steady growth in recent years. In 2019, 90 companies were active in this sector, while by 2024 the figure had reached 144.

The increase in the number of market participants reflects the gradual expansion of the production base in response to consistently strong demand. Between 2022 and 2024, the number of companies grew by 60% (from 90 to 144). This indicates that the market is expanding through the entry of new producers and suppliers, which in turn supports healthy competition.

## Companies' size

As of 2024, the market is dominated by small enterprises, which account for 80 out of 144 companies. In 2019, small enterprises also represented the majority (78 out of 90). Since 2020, the number of microenterprises has risen sharply: their share grew from 14 in 2020 to 59 in 2024. Large enterprises represent only a minor portion of the market, with 5 companies in 2024.

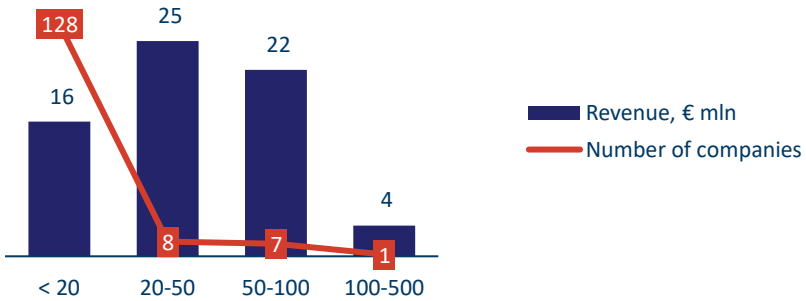
### FIGURE 71. COMPANIES' QUANTITY BY SIZE




Source: KSE Institute

An analysis of financial indicators and employment data shows that the majority of revenue is generated by a small group of medium-sized and larger companies. In particular, 7 medium-sized companies (50–100 employees) accounted for nearly one third of total market revenue in 2024 (€22 million out of €67 million). By contrast, 128 micro and small enterprises generated only €15.8 million in total revenue.

### FIGURE 72. REVENUE BY COMPANIES' SIZE



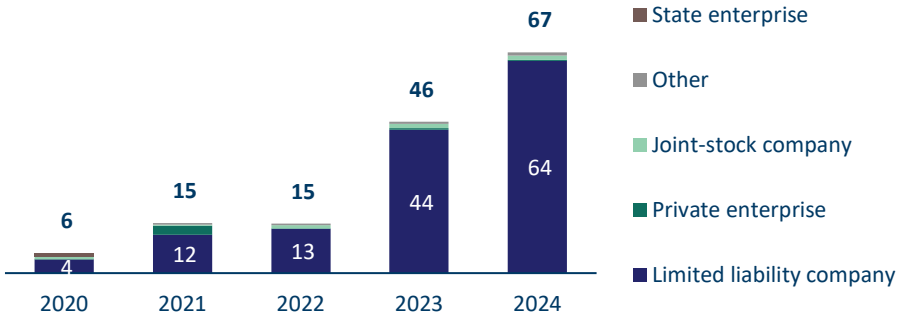

Source: KSE Institute

This demonstrates that most companies operate in the low-revenue segment. Such a structure creates conditions for potential market consolidation and for strengthening the role of medium-sized producers capable of attracting investment and establishing sustainable production and export flows.

## Ownership structure

The ownership structure of companies in the PCB and electronic components market is dominated by limited liability companies (LLCs). From 2019 to 2024, LLCs consistently accounted for the largest share of revenue, reaching €64.3 million in 2024, or more than 90% of the total. This is partly explained by the prevalence of small businesses, which often choose this legal form.

### FIGURE 73. OWNERSHIP STRUCTURE, € MILLION




Source: KSE Institute

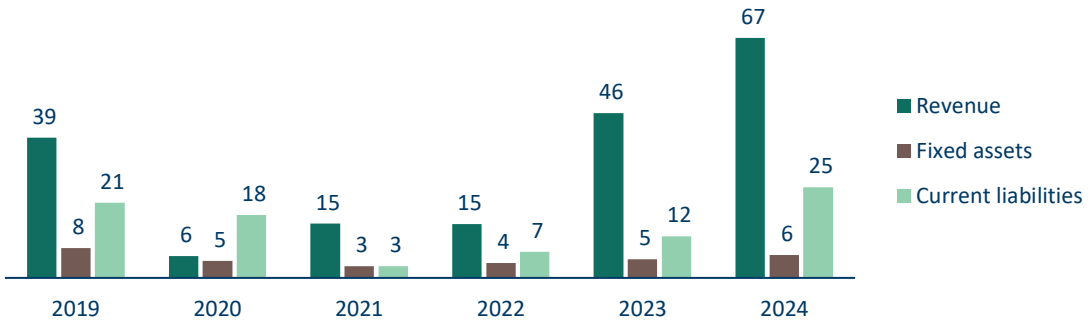
Private enterprises account for a smaller share of the market, ranging from negligible values to €19.8 million annually, with the peak recorded in 2019 (50% of total revenue). State-owned enterprises play only a marginal role: their combined revenue over the entire period amounted to just €2.7 million, underscoring the limited contribution of the public sector to market development.

Thus, the ownership structure is characterized by a high concentration of revenue in the LLC segment, while other forms of ownership remain secondary.

## Main financial indicators

The financial performance of companies during 2019–2024 showed considerable volatility, largely driven by external factors. Revenue dropped sharply in 2020 (to €6.1 million), remained relatively low in the following two years, and reached peak levels in 2023–2024 (€45.9 million and €66.9 million, respectively).

### FIGURE 74. MAIN FINANCIAL INDICATORS, € MILLION




Source: KSE Institute

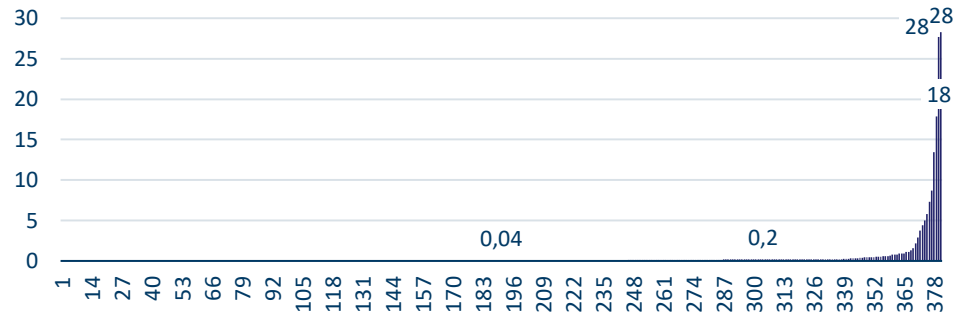
This suggests a revival of business activity and a recovery of the sector's financial stability, primarily supported by strong and sustained demand.

Fixed assets remained relatively stable, fluctuating between €3.2 million and €8.3 million. The highest level was recorded in 2019 (€8.3 million), followed by a decline, with a recovery trend beginning in 2023 (€5.3 million

in 2023 and €6.34 million in 2024). This points to limited investment in long-term assets, which may constrain the expansion of production capacity.

Current liabilities showed sharper fluctuations, ranging from a low of €3.3 million in 2021 to a high of €25.3 million in 2024. Such growth in the debt burden indicates expanding business activity but also highlights increasing risks linked to reliance on short-term financing.

**FIGURE 75. PRODUCERS' REVENUE DISTRIBUTION, 2024, € MILLION**




Source: KSE Institute

Data for 2024 reveals significant inequality in revenue distribution across companies. The majority report modest financial results: more than 60 companies earned less than €0.2 million each, while only a handful achieved substantial outcomes. The five largest companies accounted for 49.4% of total revenue. Overall, about 10% of companies generated more than 70% of sectoral revenue, while the remaining 90% operated in the low-revenue range. Consequently, the market is highly concentrated, which may stimulate M&A activity or result in the gradual exit of less competitive firms.

## Engines And Turbines

In 2024, the Ukrainian sector of engines and turbines generated an estimated €56 million in output, accounting for around 1% of the total dual-use and components market. The sector's production volume in 2024 declined by 40% compared to 2021. According to our estimates, 33 companies were active in the sector in 2024 — the same number as in the previous year. Market concentration is extremely high: a single large joint-stock company with over 1,000 employees generated about 95% of total revenues. Since 2022, current liabilities have followed a positive trend, gradually decreasing, although they remain twice as high as annual revenues, indicating continuing financial pressure across the sector.

### General market size and structure

In Ukraine, under NACE 28.11 "Manufacture of engines and turbines, except aircraft, vehicle, and cycle engines," several enterprises operate across a broad spectrum of energy and mechanical engineering. The main production areas include:

- Gas turbine units and drives – large-scale turbines for the energy sector and shipbuilding.
- Diesel and gas engines – industrial units for power generation, agriculture, and municipal infrastructure.
- Power engineering equipment – systems for thermal power plants, backup power, and industrial facilities.
- Specialized power units – prototypes of small turbines, electromechanical drives, and components for industrial use.

- Agricultural and municipal solutions – engines and mechanisms for agricultural machinery, pumping, and transport systems.

Disclaimer: most enterprises in this segment can be formally classified as dual-use, since their products could theoretically be applied at facilities producing military equipment. However, open sources often lack information about actual deployment, or such solutions have not yet found practical defence applications.

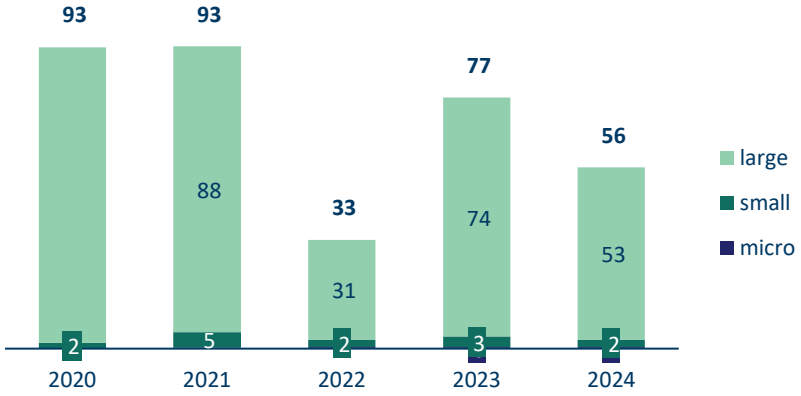
The annual volume of engine production in Ukraine can be estimated as the total revenue of companies operating under CEA 28.11. Due to incomplete reporting by the market leader, overall figures were adjusted by extrapolating the company's revenue.

It is not practical to calculate the ratio of production to international trade in the product group of engines and turbines, since dual-use engines cannot be separated in foreign trade statistics.

The engine production segment differs significantly from previously analysed markets in that it is dominated by large companies. In 2019, total revenue amounted to €93.1 million, which was the starting point for further analysis. The following year, the market contracted to €92.9 million, but in 2021 recovered to €93.2 million.

In 2022, revenue fell by more than half to €33.5 million due to the war and reduced production capacity. However, in 2023, the segment recovered to €77.4 million, while in 2024 it declined again to €55.8 million.

**FIGURE 76. COMPANIES' REVENUE BY SIZE, € MILLION**




Source: KSE Institute. Figures for 2020 and 2024 are extrapolated due to the absence of data from the market leader, which has a significant share of the segment.

Structurally, the market remains highly concentrated, with large enterprises consistently accounting for over 90% of revenue. In 2019, they generated €85.2 million of €93.1 million in total, and in some years their share exceeded 95%. Small and micro enterprises remain secondary but demonstrate greater resilience during crisis periods (2022–2024).

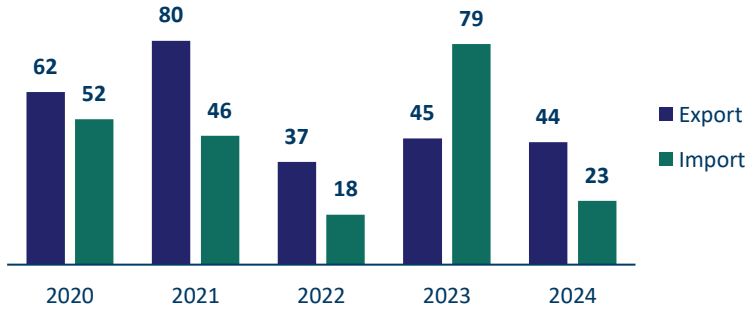
Overall, the segment contracted by almost 1.5 times between 2019 and 2024 (from €93.1 million to €55.8 million). This trend contrasts with related engineering sectors. The main reasons for the decline include strong dependence on large producers, vulnerability to military risks, and limited diversification of product portfolios among market leaders.

## Growth potential (estimated capacity, trade data analysis, other considerations)

Unlike most of the analysed segments, engine production did not grow after 2022. This is likely due to high entry barriers linked to the scale and complexity of production processes, which restrict opportunities for new entrants. As a result, demand was largely met by imports and product diversification, without scaling up production.

International trade in this segment is marked by significant fluctuations in exports and imports. Following a downturn during crisis years, further dynamics were shaped by external shocks and gradual recovery of domestic production. Import dependence increased in some years, although export positions were generally preserved.

## FIGURE 77. UKRAINIAN INTERNATIONAL TRADE, € MILLION




Source: KSE Institute

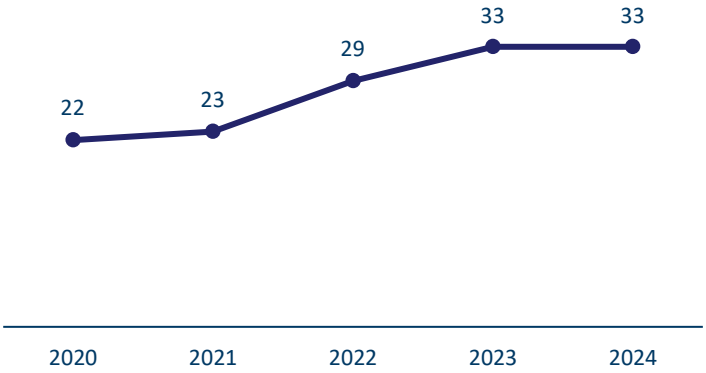
Given that trade statistics cover all engine types, not only dual-use, but they can also only serve as a general analytical background. The growth potential of the segment in Ukraine depends on:

- Restoration of production capacities of large companies
- Attracting investment in dual-use technologies
- Integration into international supply chains through EU and NATO partnerships
- Development of government programs to support the defence industry

### Number of companies

The number of companies in the engines and turbines segment grew moderately during 2020–2024. The most notable increase occurred in 2022–2023, when the number of companies rose from 29 to 33, reflecting demand growth, including for dual-use engines.

## FIGURE 78. NUMBER OF COMPANIES




Source: KSE Institute

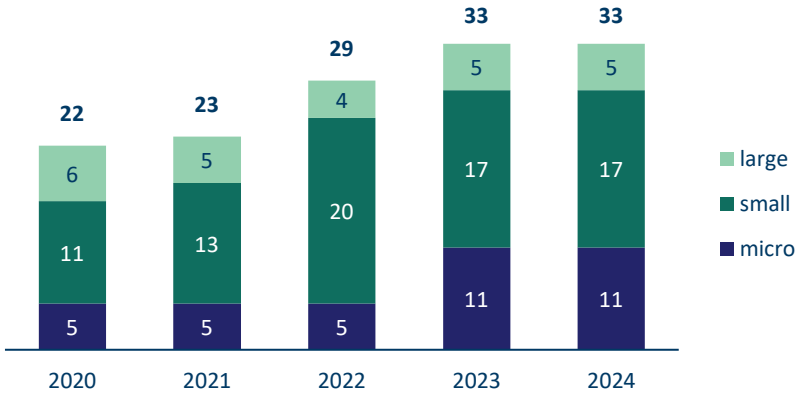
In 2024, the number declined slightly to 33, likely due to either market exit or changes in CEA classification. Over five years, however, the number of market participants increased by more than 55% (from 22 in 2020 to 33 in 2024), confirming dynamic development despite broader crisis conditions.

## Companies' size

In 2020–2021, the segment was dominated by small enterprises (over 55% of participants), while the number of large producers remained stable at about five. In 2022, the number of small companies increased to 20, driven both by new entrants and partial legalization of activity following tax policy adjustments.

In 2023–2024, the number of microenterprises increased (from 5 in 2022 to 11 in 2023–2024), while the number of small companies decreased from 20 to 17. Large enterprises remained unchanged at 5, forming the core of the industry. These dynamics indicate partial consolidation of the market.

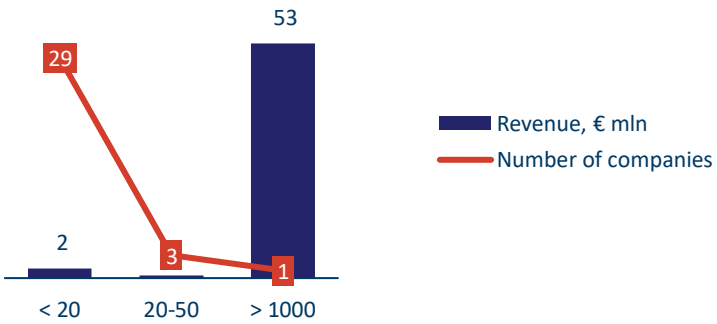
### FIGURE 79. COMPANIES' QUANTITY BY SIZE




Source: KSE Institute

Revenue distribution by number of employees confirms the dominance of large producers. Although companies with up to 50 employees comprised the vast majority (32 of 33 companies in 2024), their combined revenue was only €2.3 million. By comparison, one large manufacturer with more than 1,000 employees generated €53 million, and another with 500–1,000 employees generated €10.5 million.

### FIGURE 80. REVENUE BY COMPANIES' SIZE




Source: KSE Institute

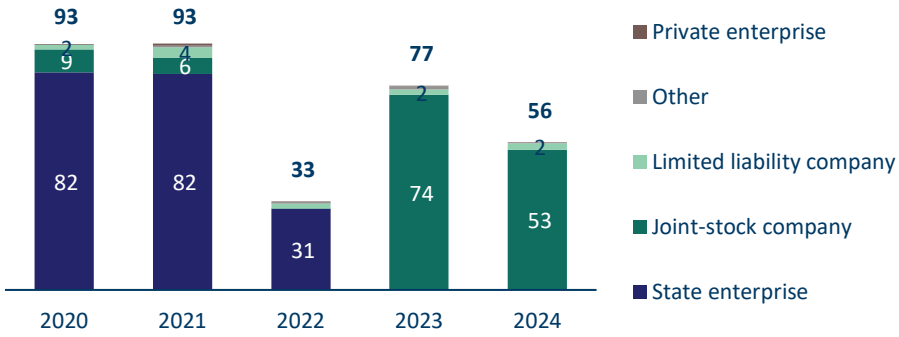
Thus, the segment combines two types of market participants: numerous small companies working in narrow niches, and a limited number of large enterprises that determine the financial dynamics of the industry.

## Ownership structure

The ownership structure of the segment changed significantly between 2019 and 2024. In 2019–2021, state-owned enterprises dominated (with revenue of €78.7 million in 2019 and €81.8 million in 2021). By 2023, however, joint-stock companies generated the bulk of revenue. This shift reflects the transformation of the

market leader, which changed ownership from a state enterprise to a joint-stock company, altering the overall structure.

**FIGURE 81. OWNERSHIP STRUCTURE, € MILLION**




Source: KSE Institute

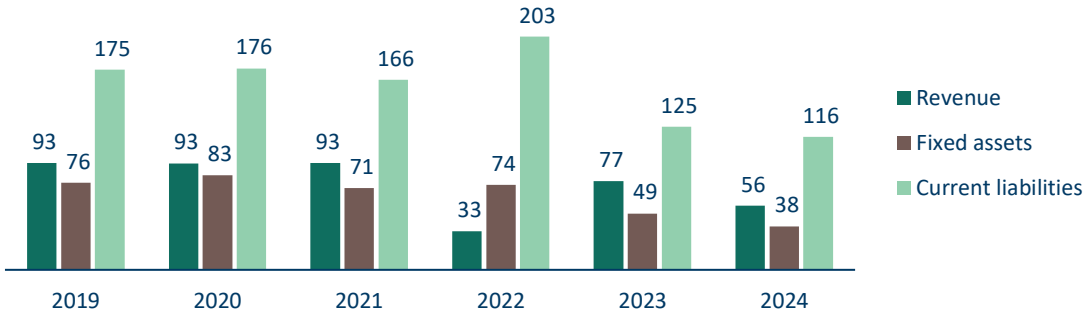
Overall, the segment has transitioned from state dominance to joint-stock leadership, increasing investment appeal.

## Main financial indicators

In 2019–2024, total revenue in the segment fluctuated between €33.5 million (the crisis year 2022) and €93.2 million (2021). After the sharp drop in 2022, the market recovered in 2023 (€77.4 million), only to decline again in 2024 (€55.8 million). This underscores the segment's dependence on a few large enterprises that generate the majority of revenue.

Fixed assets decreased from €82.6 million in 2020 to €38 million in 2024, pointing to limited investment in production facilities and possible equipment depreciation.

**FIGURE 82. MAIN FINANCIAL INDICATORS, € MILLION**

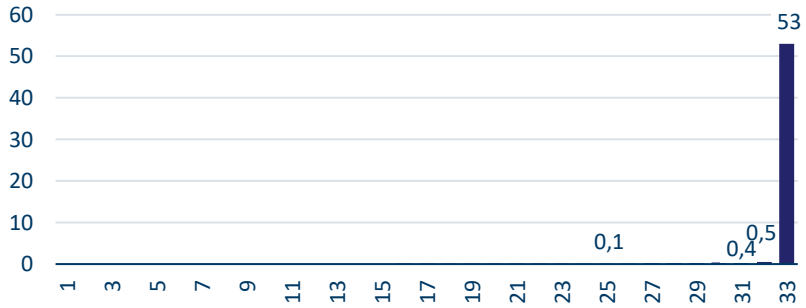



Source: KSE Institute

Meanwhile, current liabilities peaked at €203.3 million in 2022 and declined to €115.9 million in 2024, suggesting gradual financial stabilization and reduced debt burden.

The breakdown of revenue by company confirms the concentration of results within a narrow circle of players. Most companies generate less than €0.5 million annually, while two companies dominate: one with €10.5 million and the market leader with €53 million. Large enterprises therefore define the financial profile of the segment, while smaller players remain marginal in terms of industry impact.

## FIGURE 83. PRODUCERS' REVENUE DISTRIBUTION, 2024, € MILLION




Source: KSE Institute

## Construction Of Ships and Floating Structures

In 2024, the Ukrainian sector of ships and floating structures generated an estimated €50 million in output, accounting for around 1% of the total dual-use and components market. The sector's production volume in 2024 was 2.1 times higher than in 2021. According to our estimates, 61 companies were active in the sector in 2024 — the same number as in the previous year. Market concentration remains high: four medium-sized enterprises (100–500 employees) generated about 80% of total revenues. Limited liability companies represent 88% of all entities in the sector. Current liabilities remain significantly above annual revenues, pointing to continued financial strain and reliance on borrowed capital.

Under code 30.11 "Construction of ships and floating structures," Ukraine develops a range of capabilities in shipbuilding and marine engineering, serving both civilian and potential dual-use applications. Key production areas include:

- Sea-going vessels – cargo ships, tankers, and multipurpose vessels for commercial shipping.
- Specialized marine platforms – offshore service vessels, dredgers, and floating workshops.
- River and coastal craft – ferries, tugboats, patrol boats, and small transport vessels.
- Modular floating structures – pontoons, floating docks, and platforms for industrial and energy projects.
- Ship components and outfitting – propulsion systems, hull assemblies, navigation and communication modules, and safety equipment.

Ukraine's shipbuilding sector combines traditional hull construction with modern technologies for propulsion, navigation, and automation, providing capabilities for both civilian maritime activities and vessels that could theoretically be adapted for defence purposes.

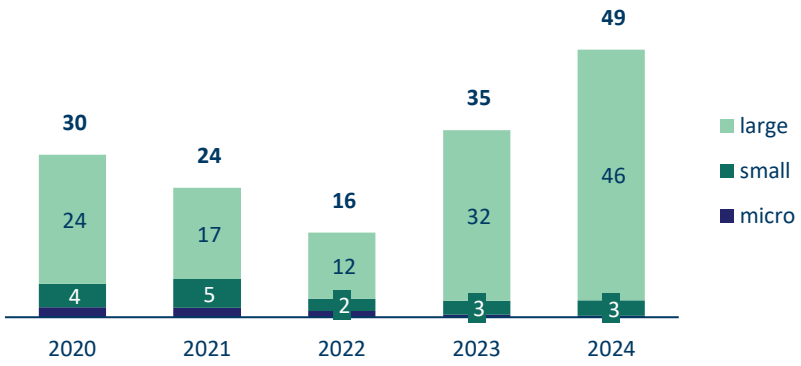
### General market size and structure

The annual production volume of ships and floating structures in Ukraine can be estimated as the total revenue of companies operating under CEA 30.11. Foreign trade data is aggregated from open sources and the State Customs Service by the following codes:

- 890392 – Yachts and boats with engine (including motorboats, speedboats)
- 8905 – Special-purpose vessels
- 890590 – Other special-purpose vessels (including rescue, fire-fighting, research, etc.)
- 8906 – Other vessels, including warships
- 8907 – Floating structures: pontoons, docks, barges

The shipbuilding industry in Ukraine is characterized by a high concentration of revenues among large enterprises, whose share ranged from 52% in 2019 to 92% in 2024. Before the full-scale invasion, the market developed at a moderate pace, with no notable impact from the COVID-19 crisis. Growth began in 2023, and in 2024 the market reached its highest value during the review period – €49.5 million.

## FIGURE 84. COMPANIES' REVENUE BY SIZE, € MILLION



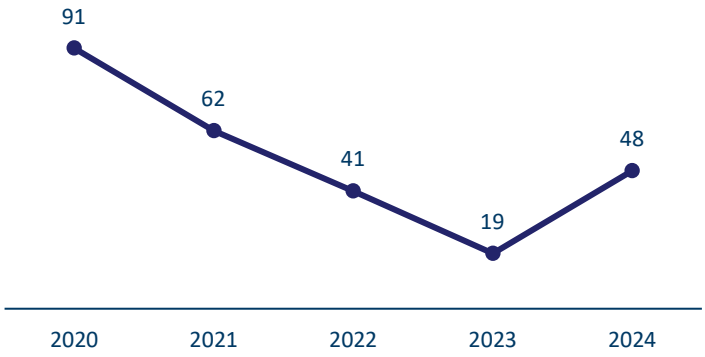

Source: KSE Institute

This growth was primarily driven by large companies, which accounted for more than 90% of the market in 2024. Small and microenterprises maintained a stable but limited role, with revenues ranging from UAH 3–6 billion annually. Their contribution is less significant in the overall structure, but they provide diversification. Thus, the market structure is asymmetric: large enterprises set the overall dynamics, while small and micro players remain niche participants.

### Growth potential (estimated capacity, trade data analysis, other considerations)

In 2024, the Ukrainian market capacity for this group of goods amounted to about €48 million, more than double the 2023 figure (€19.3 million), but significantly below the 2020 level (€90.9 million). These dynamics reflect a sharp decline in imports in 2023, followed by a recovery in both imports and domestic production in 2024. Domestic production reached €49.5 million in 2024, the highest value in five years and more than triple the 2022 level. This suggests a recovery of production capacity after the decline caused by the full-scale invasion, although overall volumes remain modest.

## FIGURE 85. MARKET CAPACITY, € MILLION

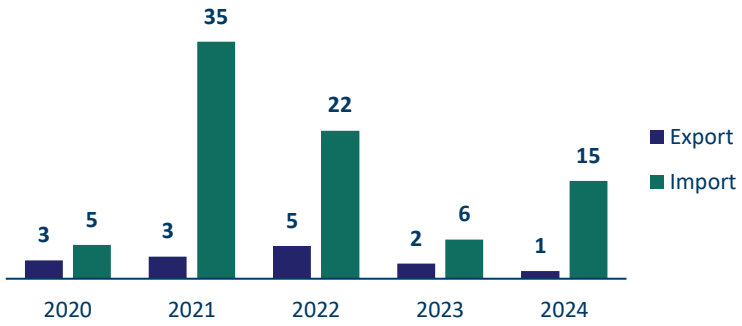



Source: KSE Institute

Imports are volatile: after peaking at €35.4 million in 2021, they dropped sharply to €5.9 million in 2023, with partial recovery to €14.6 million in 2024. Exports remain low and declining, from €4.9 million in 2022 to €1.1 million in 2024. As a result, the trade balance is persistently negative, reaching about -€13.5 million in 2024.

The low level of exports and continued import dependence indicate insufficient domestic production capacity and highlight the need for modernization. Demand remains strong but declined during the war. The recovery in 2024 indicates the potential for further growth, provided that support tools are available for producers. Expanding market capacity and strengthening export potential will require investment in modernizing production facilities, expanding the product range, and raising the technological level.

## FIGURE 86. UKRAINIAN INTERNATIONAL TRADE, € MILLION



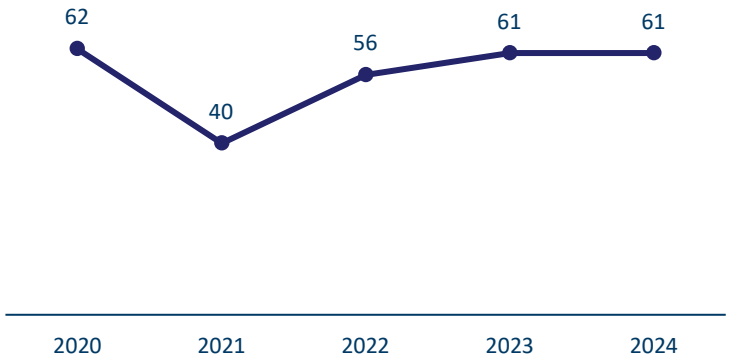

Source: KSE Institute

Thus, the market is showing signs of recovery and significant growth potential but requires systemic support to transform current momentum into long-term development and gradually reduce import dependence.

### Number of companies

Between 2020 and 2024, the number of active companies in the segment ranged from 40 to 61. The lowest figure was recorded in 2021 (40 companies), likely reflecting economic instability and the pandemic. By 2022, the number recovered to 56, and in 2023–2024 stabilized at 61.

## FIGURE 87. NUMBER OF COMPANIES




Source: KSE Institute

Despite the war, the number of companies in 2024 nearly matched the 2020 level, demonstrating resilience and potential for stability and production growth. The relatively stable number of players also reflects entry barriers: significant capital requirements and technological expertise. At the same time, this structure fosters competition among existing companies and encourages modernization and specialization.

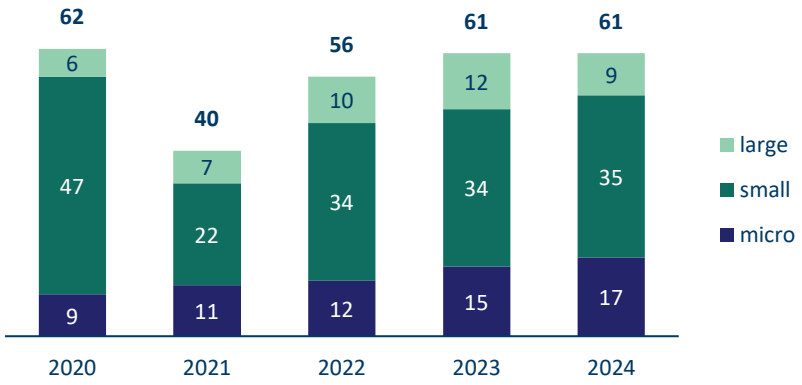
### Companies' size

The market structure in 2020–2024 was dominated by small enterprises. Their number ranged from 22 in 2021 to 47 in 2020, forming the largest group of participants. The number of microenterprises rose from 9 in

2020 to 17 in 2024, reflecting the entry of smaller producers. The number of large enterprises fluctuated without a clear trend, reaching 12 in 2023 and dropping to 9 in 2024.

Financial performance is closely linked to company size. In 2024, most companies had fewer than 20 employees (51 companies), but together they generated only €1.77 million in revenue. By contrast, four companies with 100–500 employees generated €39.34 million, highlighting the concentration of financial results among larger players. Medium-sized companies (20–100 employees) form a smaller group but achieve higher revenue per employee than microenterprises.

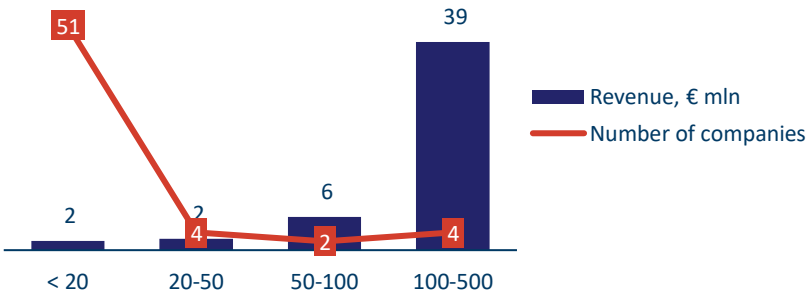
## FIGURE 88. COMPANIES' QUANTITY BY SIZE




Source: KSE Institute

Overall, the market demonstrates two trends: a growing number of small players supporting industry dynamics, and the decisive role of large companies concentrating the bulk of revenues. This structure suggests potential for further consolidation and underscores the need to support medium-sized enterprises to reduce the imbalance between the number of firms and their economic impact.

## FIGURE 89. REVENUE BY COMPANIES' SIZE



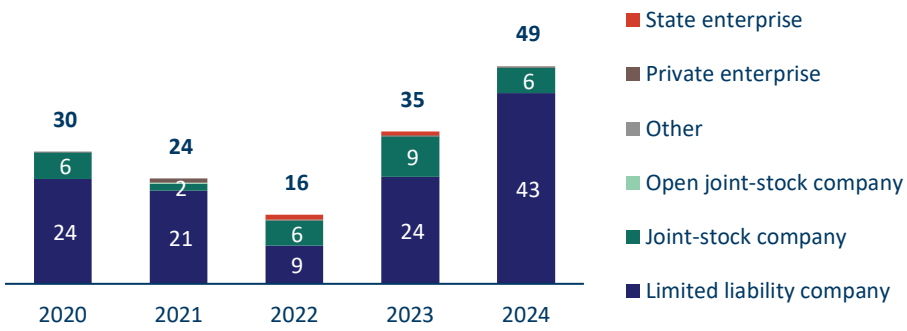

Source: KSE Institute

### Ownership structure

In 2019–2024, limited liability companies consistently dominated the market. Their total revenue increased from €8.44 million in 2019 to €43.35 million in 2024, representing the majority of the sector.

Joint-stock companies contributed but with fluctuating results, from €1.59 million in 2021 to €9.16 million in 2023. State-owned enterprises retained a small share, though strategically important in certain areas. Private enterprises and other forms of ownership had minimal impact on overall market dynamics.

## FIGURE 90. OWNERSHIP STRUCTURE, € MILLION



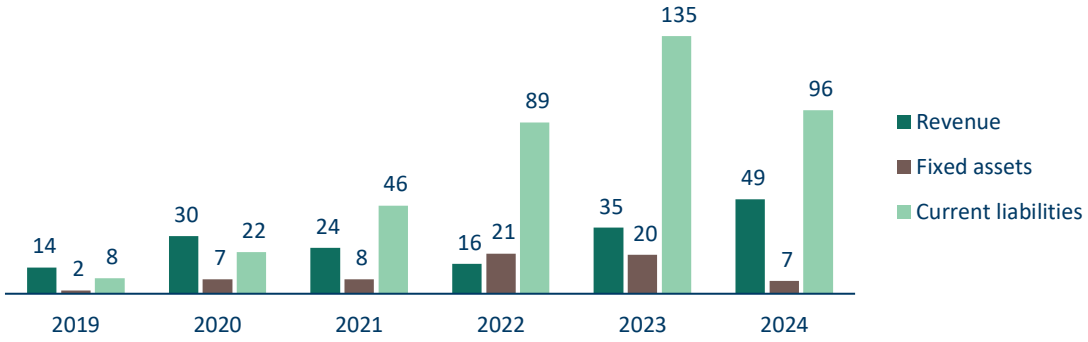

Source: KSE Institute

### Main financial indicators

Between 2019 and 2024, the financial results of shipbuilding companies were volatile, reflecting the industry's high capital intensity and long production cycle.

In 2019–2020, revenues grew alongside active fundraising. In 2021–2022, revenues fell to €15.65 million, while liabilities rose to €89.47 million and fixed assets to €21.05 million. This indicates investment concentration in production capacity, with delayed returns due to long cycles.

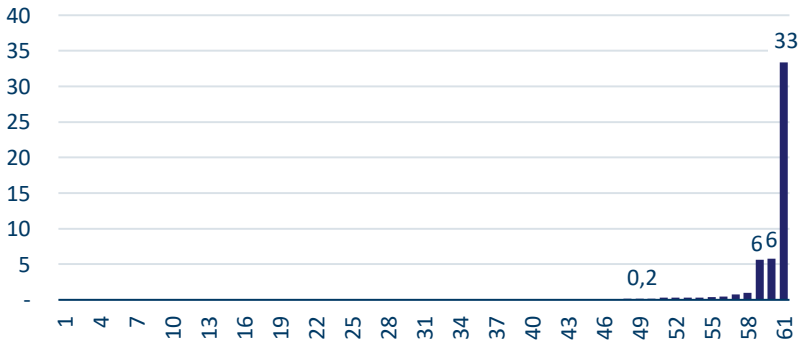
## FIGURE 91. MAIN FINANCIAL INDICATORS, € MILLION




Source: KSE Institute

In 2023–2024, revenues recovered from €34.60 million to €49.46 million, while liabilities declined from €134.92 million to €95.89 million. At the same time, the reduction in assets in 2024 may signal the completion of the investment phase and the shift toward utilization of existing facilities.

## FIGURE 92. PRODUCERS' REVENUE DISTRIBUTION, 2024, € MILLION




Source: KSE Institute

Revenue distribution in 2024 demonstrates high concentration: most companies reported less than €1 million in annual sales, while a small group of large producers generated the bulk of results. The top ten companies accounted for more than 70% of total revenue.

Thus, the shipbuilding and floating structures market combines a large number of small enterprises with a strong reliance on a few large players, resulting in volatile but investment-driven dynamics.

## Other Dual-Use Products And R&D

In 2024, the sector of other dual-use products and R&D estimated €260 million. This represents 5% of the total dual-use and components market. The sector's production volume as of 2024 increased by 33% compared to 2021. According to our estimates, in 2024, 1354 companies were active in this sector, which is 7% more than a year earlier

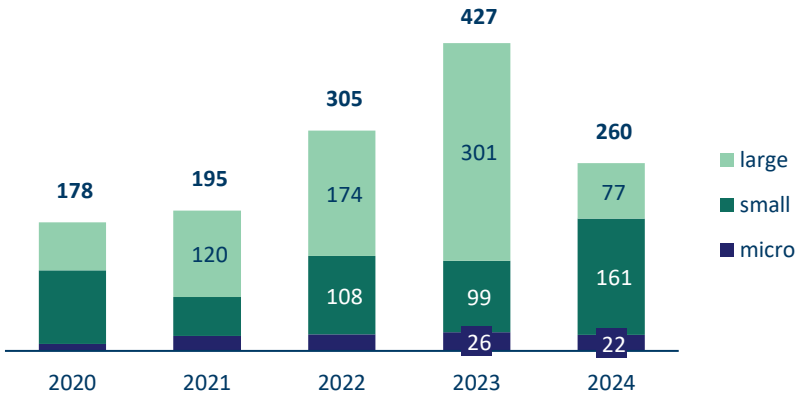
CEA 72.19 includes companies engaged in technical, engineering, and natural science research, as well as the manufacture of products based on such activities. According to the analysis of the largest enterprises by revenue (above €2 million in 2024), 27% of companies in this segment produce various dual-use products. For further analysis, data from large enterprises confirmed to operate in the dual-use segment were used, along with smaller companies without filtering, as they do not fundamentally affect the market but form the overall landscape. Several indicators are assessed based on 2023 due to limited data for 2024.

It is not possible to estimate the overall market size and foreign trade for this segment due to the broad diversity of goods and developments classified under CEA 72.19.

### General market size and structure

The segment demonstrates heterogeneous dynamics and is highly dependent on the overall economic situation. In 2019, it was the most stable year within the analysed period, with total revenue reached €400 million, largely driven by large companies. In 2020–2021, revenue almost halved, most likely due to the COVID-19 crisis.

**FIGURE 93. COMPANIES' REVENUE BY SIZE, € MILLION**




Source: KSE Institute, Data from market leaders for 2024 are missing due to incomplete statistics (possibly related to production secrecy).

Starting in 2022, the market entered a recovery phase despite the crisis caused by the full-scale invasion. Revenue increased to €305 million in 2022 and exceeded €427 million in 2023. At this stage, revenue concentration among large enterprises was particularly strong, while small and micro enterprises demonstrated moderate growth.

Data for 2024 indicate a decline to €260 million, but this figure is not representative, as it excludes the results of leading market players. The actual scale of the segment is significantly higher, and it is likely that the market would have continued to demonstrate positive dynamics without these statistical gaps.

Thus, the structure of the segment combines the strong influence of several large producers with the gradual strengthening of small and medium-sized companies.

## Growth potential

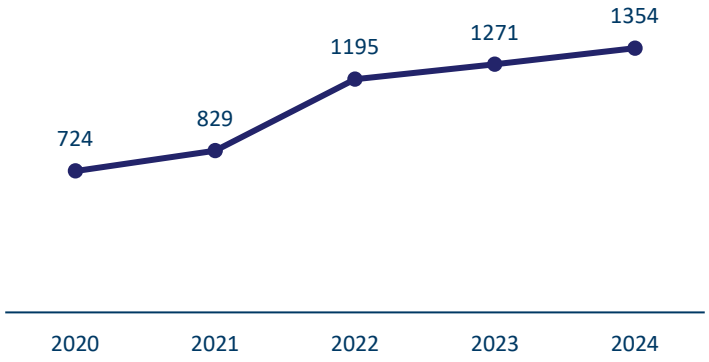
It is not possible to calculate precise market capacity, as the assessment of foreign economic activity is complicated by the wide range of goods and developments included in this segment. Imports may influence the market through the supply of specialized components and technologies that are not produced domestically, creating competition for Ukrainian producers. Exports may become an important source of growth if certain developments find commercial application abroad.

Overall, the sector's prospects will depend on changes in domestic demand, investment in production capacity, and the ability of companies to access foreign markets.

## Number of companies

The market shows a steady increase in the number of participants. After relatively moderate dynamics in the early years, significant expansion has been observed since 2022, and this trend has remained stable. While in 2020 about 724 companies operated in the market, in 2021 their number exceeded 820, in 2023 it reached 1,271, and in 2024 more than 1,350.

**FIGURE 94. NUMBER OF COMPANIES**




Source: KSE Institute

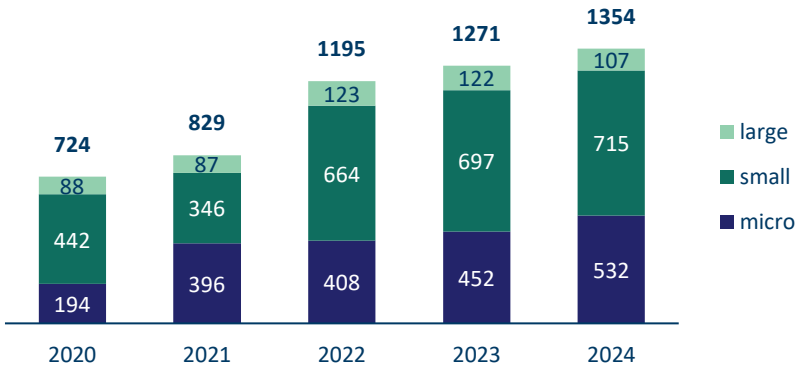
Overall, the number of companies in the segment has almost doubled, demonstrating its attractiveness to new players and growing interest in production and research.

## Companies' size

For analysis of the market structure, 2023 data were used as the most complete and representative.

The segment mainly consists of micro and small enterprises. The largest group comprises companies with up to 20 employees — more than one thousand entities — though their total revenue remains relatively modest. Enterprises with 100–500 employees form a smaller group but generate total revenue exceeding €100 million, indicating higher average efficiency compared to smaller companies.

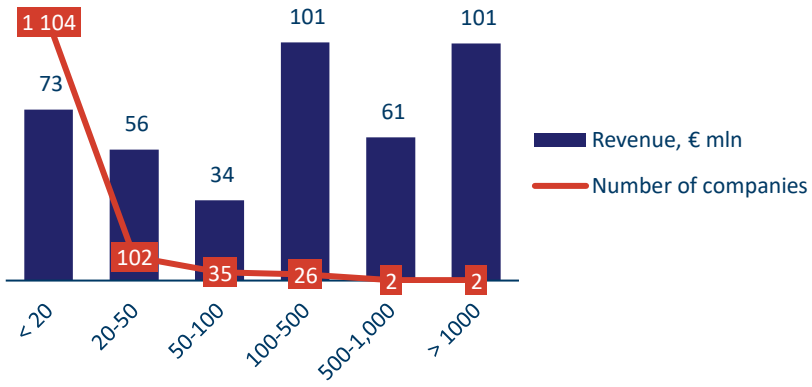
## FIGURE 95. COMPANIES' QUANTITY BY SIZE




Source: KSE Institute

Large producers with more than 500 employees remain rare. Only a few companies in this category generate revenues of €70–100 million each, significantly above the average for micro and small enterprises.

## FIGURE 96. REVENUE BY COMPANIES' SIZE




Source: KSE Institute

Thus, the market remains fragmented, with small players dominating in number but revenues highly concentrated in a limited group of medium and large companies.

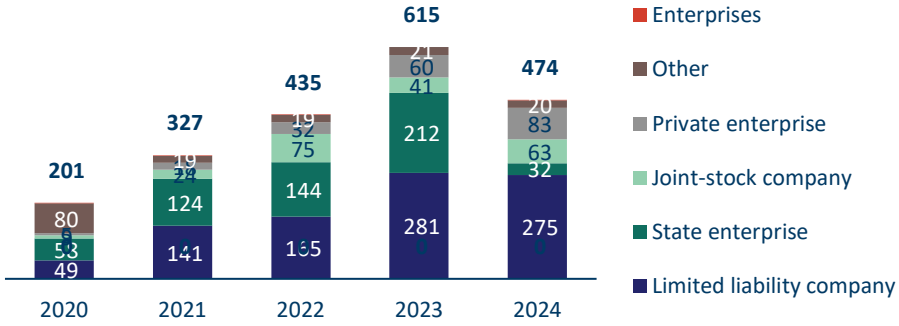
### Ownership structure

Data for 2023 were used to analyse the ownership structure, as this year provides the most complete statistics. The segment demonstrates high diversity in ownership forms, though revenue is concentrated among several key types of enterprises.

In 2019, limited liability companies (over €200 million, or about 38% of revenue) and state-owned enterprises (almost €290 million, over 50% of revenue) dominated the segment. Other forms of ownership, including private enterprises (€16 million) and joint-stock companies (€28 million), played a relatively minor role. By 2023, the situation had shifted. LLCs accounted for the largest share (approximately €275 million, almost 45% of total revenue), while the role of state-owned enterprises decreased to €212 million (34%).

Thus, between 2019 and 2023 the market demonstrated a gradual transition from state-owned enterprises to private ownership. The public sector remains a significant player, but LLCs generate the largest share of revenue.

## FIGURE 97. OWNERSHIP STRUCTURE, € MILLION

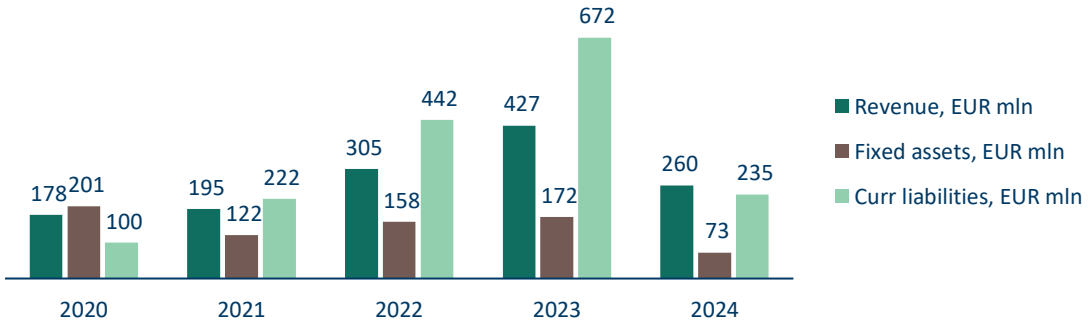



Source: KSE Institute

### Main financial indicators

Between 2019 and 2024, revenue fluctuated significantly, from a low of €178.1 million in 2020 to a high of €426.7 million in 2023. Following the sharp decline in 2020, gradual recovery culminated in the 2023 peak. Data for 2024 remain incomplete, likely due to the absence of reports from market leaders. The upward trend is expected to continue.

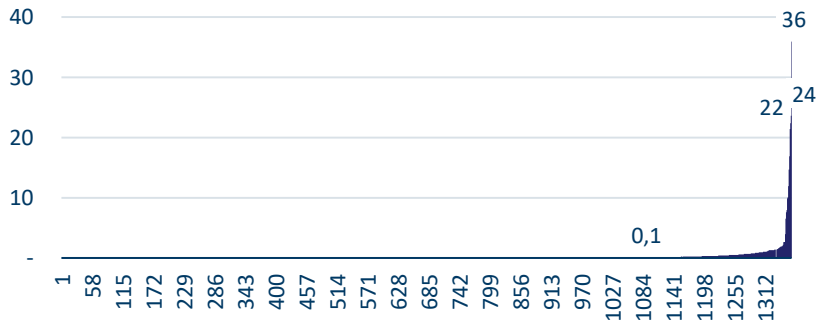
## FIGURE 98. MAIN FINANCIAL INDICATORS, € MILLION




Source: KSE Institute

The value of fixed assets also increased gradually, reflecting the overall development of the segment. Current liabilities peaked in 2023 (€671.8 million), suggesting an expansion of financing activity, likely directed toward the development of production capacity.

## FIGURE 99. PRODUCERS' REVENUE DISTRIBUTION, 2024, € MILLION




Source: KSE Institute

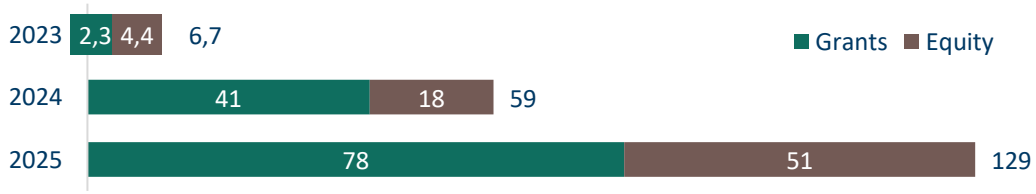
The distribution of company revenues confirms strong market concentration. In 2023, the vast majority of companies reported annual revenues of less than €1 million, while several large players accounted for the main results. Two companies generated more than €50 million each, and one exceeded €60 million. Thus, the financial performance of the segment is largely determined by a limited number of large enterprises.

# CURRENT SOURCES OF FINANCING

Grants remain the largest share of all financing, accounting for 69% of total funding received. Nearly the entire amount was provided through Brave1. Equity investments came mainly from angel investors and venture capital funds, focusing on early-stage companies (pre-seed, seed). All active funds in 2023 were Ukrainian-based with a defence specialization. Many of these investors also acted as accelerators, combining financial support with mentorship for young, immature companies. A slight shift occurred in 2024, as several international investors entered the sector, including R-G.AI, Darkstar, and others. Direct investments – predominantly repair and maintenance hubs, companies consider security risks as well as intellectual property issues.

In 2025 Ukrainian tech companies received $498 million of financing (investments and grants). An estimated 26% of all investments and grants were directed to defense companies and startups. The total amount of financing (investments and grants) reached $129 million.[2] The real figure may be higher, as part of the defense tech funding remains undisclosed due to security considerations.

### FIGURE 100. EQUITY INVESTMENTS AND GRANTS FOR DEFENCE COMPANIES AND STARTUPS, $ MILLION




Source: AVentures Capital, KSE Institute

The majority of significant investments targeted the software segment, seen as lower-risk compared to hardware or weapons production. Software avoids restrictions such as export prohibitions and circumvents investors' general reluctance to fund arms manufacturing.

The current financing structure reflects the early stage of Ukraine's defence and dual-use industry: a large number of immature startups, often with weak business development skills and a need for structured support.

## Grants and Government Programs

Prior to 2022, funding for Ukrainian defence startups was minimal. Moreover, in 2022 there were still no state investments in defence-specific startups. By 2023, however, the government began directly supporting defence tech. The Brave1 defence-tech cluster was launched in mid-2023 as a state platform to fund and mentor startups. The Brave1 program requires applicants to be legal entities registered in Ukraine, with priority given to Ukrainian producers whose projects have passed defence expertise. Companies must not have business activities, subsidiaries or founders in Russia, Belarus or other sanctioned jurisdictions. While official documents do not specify a fixed ownership threshold, available information indicates that 100 percent Ukrainian ownership is not a formal requirement. The presence of foreign, including EU, shareholders, appears possible provided the company is incorporated in Ukraine, complies with sanctions restrictions, and operates within the program's defence and dual-use technology framework. The emphasis

[2] See "Dealbook of Ukraine", AVentures Capital

on “Ukrainian producers” suggests that majority Ukrainian ownership may be preferable in practice, but no explicit legal limit on foreign participation has been identified.[3]

Brave1 is a government platform (state cluster) established as a coordination structure under the auspices of the Ministry of Digital Transformation, the Ministry of Defence, the General Staff, the National Security and Defence Council, the Ministry for Strategic Industries, and the Ministry of Economy of Ukraine. Legally, it is not a separate enterprise or company but operates within the Innovation Development Fund. Following a government reshuffle, Brave1 is now part of the Innovation Development Fund, which integrates both Brave1 and the Ukrainian Startup Fund under the direction of the Ministry of Digital Transformation.

The Fund acts as the contracting party with participants of the *Brave1 Market* (adhesion agreements with individuals and legal entities). In practice, Brave1 functions as a state program – a marketplace for applicants – in the form of a cluster supporting defence technologies and initiatives.

Since launch, Brave1 has issued grants range from ₴500k up to ₴8 million each (≈ $13k–$210k)[4]. For example, Brave1 provided $24k to DeepState (Kolossal) for an OSINT system, $48k to Swarmer for drone swarming AI, and $25–30k to several UAV and robotics projects.

By early 2025, Brave1 had supported 1,500+ companies and 3,200 projects. Notably, $40 million of the ~$59 million raised by Ukrainian defence startups in 2024 came as grants from Brave1.

Beyond grants, Brave1 functions much like an accelerator or innovation hub. It organizes hackathons, idea competitions, and provides mentorship with military experts. In 2024 it hosted defence tech challenges to evaluate ideas and fast-track the most promising for development and frontline deployment.

Ukraine’s Innovation Development Fund (Ukrainian Startup Fund, USF), a government-backed seed fund launched in 2018, also pivoted toward defence tech. In early 2023 USF was moved under the Ministry of Digital Transformation to align with wartime priorities. By 2023, USF had invested about $2.5 million in early-stage tech companies, including defence and dual-use projects. It provided small grants (typically $25k–$50k) to UAV developers like AeroDrone ($50k), IZIVIZ inspection drones ($25k), Ukropter UAVs ($35k), and even a tactical training app (Drill, $25k).

USF formally launched the Dual-Use Grant Support Program on 6 June 2022 to back technologies usable for both civilian and defence needs (defence, cybersecurity, healthcare, education, infrastructure). Goal: strengthen defence capability and speed post-war recovery.

The program offered up to $35,000 per project, split between $25,000 in direct support for the startup and up to $10,000 to pay for an accredited accelerator. According to our estimations, during 2022–2023, Ukrainian companies working on dual-use technologies received up to $1.2 million in grants. The grants came bundled with mentoring and expert support, ensuring that young teams could refine both their technology and their business models.

By early 2023, 20 finalists had been selected, and by spring the program had already funded over two dozen startups. The diversity of ideas reflected the wartime moment: new drone prototypes, protection and sensing systems, training apps for weapon handling, and even CRM solutions adapted for defence procurement.

Other USF programs. While were not targeted directly on dual-use goods or defence industry, had also some grants to such entities. Seeds of Bravery is a €20 million project funded by the European Union under the European Innovation Council (EIC) to support Ukrainian tech startups bringing them closer to the EU. In 2024, 137 different projects received grants amounting to $3.76. On 26 February 2024, USF teamed up with the

[3] Brave1 – Ukrainian Defense Innovations
[4] 15 active investors in Ukrainian Defence Tech, Defender Media

Ukraine-Moldova American Enterprise Fund (UMAEF, formerly WNISEF) to launch a $2.5 million grant program aimed at early-stage tech startups across fields like AR/VR, AI, biotech, e-government, medtech, and more. The program is fully managed by USF, while WNISEF provides financial backing. Its financing is estimated at up to $1.5 million in 2024.

In 2025, the grant program Made for Victory was introduced by the Ministry of Economy and former Ministry of Strategic industries. Enterprises can receive up to UAH 8 million for equipment purchases on a co-financing basis – 50% covered by the state, 50% by the company.

Special conditions:

- For frontline-region enterprises and UAV producers, grants cover up to 80%.
- Max grant: UAH 8 million.
- Funding covers purchase, delivery, and installation of equipment.

Eligibility: Both operating enterprises and new entrants. Requirements – transparency, tax discipline, no ties to the aggressor state.

Process: Applications through *Diia* portal ↠ business plan (feasibility study) ↠ authorized bank ↠ interview ↠ review by Ministry of Economy (~2 weeks).

Google for Startups' Ukraine Support Fund has provided over $15 million in funding in $100k grants, mentorship, and Google Cloud credits to Ukrainian startups. Since its launch in 2022, it has supported around 82 teams.

## Loans

In Ukraine, the government introduced the "5-7-9" affordable loan programme in 2020 to support small and medium-sized businesses with concessional credit. Initially it was open to a wide range of sectors, with no specific exemptions for dual-use goods, but the defence industry was formally included only in 2024. CMU Resolution № 1288 (05.11.2024) "Some issues of providing state financial support to enterprises designated as critical for the functioning of the economy during a special period in the defence-industrial sector" applies to enterprises recognized as critical by Ministry of Defence (earlier – Ministry of Strategic Industries).

Form of support: partial compensation of loan servicing costs. Support is provided via the Business Development Fund (under Ministry of Finance).

Eligible loans: for development, production, repair, modernization, and disposal of arms, military and special equipment, ammunition, and components to meet the needs of the Armed Forces and other military formations.

- Purpose: both investments and working capital.
- Loan amounts: up to UAH 500 million for 5 years (investments), up to UAH 100 million for 3 years (working capital).
- Maximum interest rate: UIRD(3m) + 5%.
- Reduced to 5% annual effective rate.

Financing scheme:

The recipient obtains critical status, concludes a loan agreement with an authorized bank under set terms, the Fund opens an escrow account at the bank, and the bank receives repayment of interest from the Fund.

Assessment: The simplest, most transparent, and tested mechanism. It applies not only to defence but other sectors too. However, given the specific risks of the defence sector (supply chains, procurement, force majeure), it is advisable to establish a separate sub-program for the defence industry.

As of February 2026, 108 loans granted worth ~UAH 6.7 billion (~$160 million) and 103 enterprises applied. An additional 13 loans have already been approved for disbursement, and 68 applications are currently under review.

To obtain an affordable loan, manufacturers must apply to a bank participating in the program. Currently, there are five banks that meet defined security criteria: Ukreximbank, Oschadbank, MTB Bank, PUMB, and Bank Credit Dnipro.

## Private Investments and Venture Capital

Several key investors (funds and individuals) stand out for their significant financial contributions to Ukraine's defence-tech sector:

D3 Venture Fund (Eric Schmidt **&** Partners): Announced as a $30M fund purely for Ukrainian defence tech, D3 is among the biggest pools of private capital. By late 2024 it had made multiple investments (approximately $1M deployed as of then) and signalled willingness to lead larger rounds. D3's high-profile backing (Google's ex-CEO) also brought credibility, attracting other investors to look at Ukraine. For example, D3's involvement was a "pivotal moment" that catalysed more foreign interest in 2023.

Portfolio examples:

- Albacore – Autonomous underwater vehicles; stealth project.
- Chariot Defence – Defence-hardware company powering modern battlefield systems.
- Kela Technologies – Secure open platform enabling rapid integration of commercial and military systems.
- Stridar – Ground drones; scalable robotic solutions focused on safety, efficiency, affordability.
- Airlogix – Fixed-wing UAVs for various missions.
- Guardian RF – EW and SIGINT: smart signal processing.
- Neros Technologies – Multi-domain suite of smart, mass-manufacturable defence systems (UAV etc.).
- Frontline Robotics – Integrated tactical robotic systems for remote operations.
- Tytan Technologies – cUAS (counter-unmanned aerial systems) solutions.
- Buntar Aerospace – Reconnaissance long-range UAV and mission control software with AI.
- Swarmer – AI-managed command & control centre for coordinating drones.
- Drone Space – Advanced electronics and avionics drone company.
- Ailand Systems – Smart autonomous drones for demining and agriculture.
- Zvook – Acoustic sensing technologies for security applications.
- Highcat – Economical UAVs for safe and reliable use in security missions.

MITS International Defence Accelerator: Launched in early 2024 with a target fund size of $50 million, MITS combines an accelerator program with follow-on capital. It initially invested $200k each in several startups (exact names undisclosed for secrecy) working on drone communications, wearable detectors, GPS-denied navigation, etc. Notably, MITS then provided the $3.74M Series A to Tencore – "the largest publicly confirmed investment in Ukraine's ground combat robot sector". MITS also co-led other deals like Teletactica's $1.5M seed and UADamage (drone demining AI) with $400k. This shows MITS scaling up from seed tickets to multi-million investments, making it a crucial investor in 2025.

Portfolio examples:

- Tencore (ground combat robots, Series A $3.74M),
- Teletactica (robotic control systems, $1.5M seed),
- UADamage (AI for demining drones, $400k),
- Vermeer (visual positioning system replacing GPS).
- NORDA DYNAMICS — company focused on drone autonomy, building autonomy software and systems for unmanned aerial systems (UAS).
- M-FLY — developer of laser-guided systems and stabilized gimbal payloads for drones and ISR (intelligence, surveillance, reconnaissance) applications.
- TENCORE — manufacturer/designer of unmanned ground vehicles (UGVs) for tactical and logistics roles.
- AEROMOTORS — developer and producer of specialized drone motors and propulsion components.
- OKO CAMERA — company working on thermal imaging cameras and vision systems for surveillance and targeting.
- ANGLER — developer of unmanned surface vehicles (USV) and unmanned underwater vehicles (UUV) for maritime applications.
- SPEYE — company focused on spatial vision systems (advanced computer vision / sensing solutions).
- VIDAR SYSTEMS — creator of acoustic locating systems (acoustic sensors and localization solutions).

Green Flag Ventures: Although a smaller fund, GFV is noteworthy as an early US venture initiative in the war. Run by a former US intelligence officer and a longtime Kyiv tech advisor, GFV has been hands-on in nurturing startups and bringing a network of Western mentors. It typically invests in the $100k–$600k range[5]. GFV's significance lies in bridging Ukrainian startups to US/European markets and follow-on investors.

Portfolio examples GFV's backing helped Himera and Kara Dag gain visibility; Himera later attracted additional German investment (Freedom Fund VC). GFV also partnered on Teletactica's seed round with MITS.

Western NIS Enterprise Fund / u.ventures: WNISEF (funded by US government) has played a DFI role. Through its venture arm u.ventures, it has put millions into Ukraine's tech scene, including defence-oriented deals. It not only provided direct equity (e.g. Osavul, Esper Bionics) but also lends institutional credibility as a quasi-government fund. WNISEF's involvement often signals to other foreign investors that a startup has passed rigorous due diligence. For instance, u.ventures' $3M+ in Osavul and Esper was done alongside German co-investors. This demonstrates how DFIs can mobilize additional capital into Ukrainian dual-use tech.

Portfolio examples: Osavul (AI-powered security analytics, $3M+), Esper Bionics (cyber-medical/dual-use).

Notable Individual Investors: High-net-worth individuals have also stepped up. The most prominent example is Brooks Newmark, a former UK Member of Parliament, who personally invested $5 million in 2025 to co-found Trypillian and acquire Ukrainian drone tech teams. Newmark's approach – essentially forming a mini-conglomerate of startups – is unique and signals confidence that Ukraine's innovations can scale with proper management. Another individual, ex-Google's Eric Schmidt (via D3), we've already noted. Additionally, Ukraine's own tech entrepreneurs have reinvested war profits and personal funds: e.g. Uklon's founders created Nezlamni Fund ($2M), and Max Polyakov (a Ukrainian space tech millionaire) has reportedly supported drone projects behind the scenes (though not always publicized).

[5] See "Garage Land: Ukraine's Defense Start-Ups", CEPA

Major Ukrainian VC Funds: Aside from SMRK, funds like Horizon Capital – historically Ukraine's largest PE/VC firm – raised a new $250M "Ukraine Phoenix" fund in 2022. While Horizon focuses broadly (IT, manufacturing), it has signalled interest in dual-use industries as part of Ukraine's recovery. By 2025 Horizon reportedly made its first defence-sector deal (details confidential), and others like TA Ventures (a well-known Ukrainian VC) have begun scouting defence tech. These big domestic funds bring larger check-writing capacity if a defence startup needs tens of millions to scale in the future.

Western Defence Corporations: By 2025, much foreign investment is coming not just from VCs but "from Western defence companies" directly. They invest for strategic collaboration, not financial return alone. For example, in 2024 German drone maker Quantum Systems acquired a 10% stake in Ukraine's Frontline and can boost it to 25% within a year. The amount wasn't disclosed, but this stake purchase likely involved a few million dollars plus technology transfer. Similarly, Denmark's defence giant Terma A/S entered a joint R&D partnership with Ukraine's Odd Systems (a drone and thermal imaging startup) to co-develop a drone interceptor; while the investment sum is undisclosed, the alliance itself is considered a significant commitment of resources. These strategic investors (Quantum, Terma, etc.) bring not only funds but also expertise, supply chain access, and paths to international markets. Their presence is "a clear understanding that…the primary threat is Russia, and no one knows how to counter it better than Ukraine," hence they are keen to tap Ukrainian know-how.

Resist.ua Fund: One of the most visible grassroots initiatives, Resist.ua channels donations from global supporters into early-stage Ukrainian defence tech. While the checks are relatively small (tens to hundreds of thousands of dollars), the fund has backed several FPV and EW-focused teams that otherwise might not have survived the prototyping stage. Its strength lies in speed and flexibility: Resist.ua can mobilize capital within weeks, bypassing slower institutional processes.

Portfolio examples: early FPV drone teams and EW prototypes, often sustaining startups through prototyping stages.

Nezlamni Fund. Founded in 2024 by Uklon's co-founders, Nezlamni is a Ukrainian venture capital fund with a capital base of approximately $2 million. It focuses on defence-tech and security startups with technological potential. Typical checks range from $100–400k. The fund is highly targeted toward the Ukrainian market while keeping international scalability in mind.

Portfolio examples: Buntar Aerospace (advanced UAVs), Himera (secure communications systems), Mantis Analytics (government and military analytics), Ailand Systems (UAVs for explosive detection), Frontline (robotic air and ground systems).

Darkstar Fund: An emerging Kyiv-based defence-focused VC with undisclosed fund size, Darkstar operates more quietly but is reported to have syndicated investments with both MITS and Green Flag. Its strategy emphasizes "combat validation" – only startups whose tech has proven effective in the field receive follow-on support. While still early, Darkstar's network within Ukrainian special operations units gives it privileged insight into frontline needs.

Portfolio examples: Farsight Vision (battlefield reconnaissance platform, pre-seed).

Freedom Fund VC: Established by a consortium of US and European investors in 2023, Freedom Fund has positioned itself as a growth-stage investor. Typical tickets are $1–5M, filling the gap between seed accelerators and large PE funds. It co-invested in Himera after Green Flag's seed and has taken board seats in select drone and communications startups. Its capital strength and Western LP base make it one of the few funds able to write multi-million checks at scale.

Portfolio examples: Himera (secure communications), later-stage drone and cyber-tech companies

Angel One Network: Not a single fund but rather a coordinated syndicate of Ukrainian and diaspora angel investors. Angel One typically pools $50–250k from individuals into seed rounds of defence and dual-use startups. Beyond money, its members provide mentorship and connections abroad. For instance, Angel One contributed to UADamage's early financing

Portfolio examples: Swarmer (drone swarm mission management), Mantis Analytics (cyber analytics), Buntar Aerospace (UAVs), Frontline (robotic air/ground systems). alongside MITS.

Defence Builder: Founded in 2024 by Sigma Software Labs, the Kyiv School of Economics, and Buntar Aerospace, Defence Builder is a Ukrainian accelerator that combines training, mentorship, and early financing for defence startups. Its four-month program provides legal and financial support, field testing, and grants (typically $10,000 per team, with up to $30,000 for Demo Day winners), while a syndicate model allows individuals to invest from as little as $1,000. Focused on UAVs, EW, AI-driven automation, demining, and communications, the accelerator has already produced teams such as Strug (a long-range unmanned boat for FPV drones) and Coalas (drone control systems resilient to EW). Partnered with Ukraine's Ministry of Defence, Defence Builder plays a niche role in aligning early-stage innovation with immediate battlefield needs, though its total capital base remains undisclosed.

Portfolio examples: Strug, Coalas, Barvinok-5 received $30,000 each for Demo Day results

Varangians Fund: Backed by Ukrainian veterans and private entrepreneurs, Varangians takes a distinctly "operator-led" approach. The fund not only invests but also embeds ex-military advisors into startups, ensuring battlefield relevance. Varangians has funded projects in drone swarming, secure battlefield comms, and AI-based targeting. Its brand resonates strongly with frontline units, giving it credibility and rapid feedback loops.

Portfolio examples: swarming drones and battlefield communications projects (undisclosed).

In summary, Brave1 and state funds provided the early-stage fuel, venture funds (D3, MITS, GFV, WNISEF, local VCs) are scaling up rounds, and now global defence companies and prominent individuals are injecting larger investments and forming partnerships. This multi-layered investor base did not exist before the war – it is a new ecosystem that has rapidly evolved to funnel money into Ukraine's defence innovations.

## Foreign Direct Investment

Another form of financing is direct investment by foreign defence companies setting up operations in Ukraine. Since 2022, several international firms have entered Ukraine's defence and dual-use market, bringing capital, technology, and joint production. Key examples:

Baykar (Turkey): Turkish drone manufacturer Baykar is building a large production facility in Ukraine – a landmark foreign investment. Construction near Kyiv began in 2023 and is expected to be complete by mid-2025. The plant will employ about 500 people and produce up to 120 drones per year (Bayraktar TB2 or newer TB3 models). Baykar's CEO Haluk Bayraktar affirmed that "nothing" will halt the plan despite the war. While the exact cost isn't public, the factory size and workforce imply a tens of millions of dollars investment. This move cements a long-term Turkey–Ukraine defence partnership (Ukraine was a key buyer of TB2s pre-war). By localizing drone manufacturing, Baykar will integrate into Ukraine's supply chain and possibly benefit from Ukraine's skilled engineers (Baykar has even begun training Ukrainian staff to operate the facility). Strategically, the Ukrainian plant could also export drones to Europe faster.

BAE Systems (UK): In 2023, Britain's largest defence company BAE Systems established a local Ukrainian subsidiary – the first major Western defence contractor on the ground. BAE signed agreements with the

Ukrainian government to produce 105mm light artillery guns in Ukraine and explore other joint projects. By August 2023, BAE had opened an office in Kyiv. It is assisting with maintenance of equipment provided to Ukraine and looking to partner with Ukrainian companies for manufacturing. One concrete step: Ukraine and Sweden (BAE owns Bofors in Sweden) agreed to cooperate on production and servicing of CV90 infantry fighting vehicles in Ukraine. BAE's entry is as much strategic as financial – the investment so far is in establishing the entity and transferring know-how, rather than a big cash injection. However, it paves the way for building local production lines (e.g. an assembly line for L119 105mm howitzers). BAE's presence also signals to other defence firms that Ukraine is open for business despite the war.

Rheinmetall (Germany): Rheinmetall AG has been in talks to undertake a €200 million investment in the field of defence to build a tank and armoured vehicle factory in Ukraine. In March 2023, Rheinmetall's CEO said a Ukrainian plant could produce up to 400 tanks per year (likely the KF51 Panther, a next-gen MBT) and negotiations were promising. By mid-2023, Rheinmetall formed a joint venture with Ukrainian Defence Industry (Ukroboronprom) and by June 2024 opened a maintenance hub in western Ukraine. The JV plans to locally produce Rheinmetall's Lynx armoured vehicles and jointly manufacture "a six-digit number" of 155mm artillery shells per year in Ukraine. Rheinmetall will own 51% of this ammo production JV. This is effectively foreign direct investment combined with technology transfer: Ukraine gains production capacity (and partial financing from Rheinmetall) to make Western-caliber ammo and vehicles on its soil. By 2024, Rheinmetall's maintenance centre was already repairing tanks and IFVs in Ukraine, and plans were underway to set up Lynx vehicle production via the JV. If the full tank factory materializes, it would be one of the largest single manufacturing investments in Ukraine's defence sector to date.

A number of other foreign companies have started joint projects:

Quantum Systems (Germany): starting from service hubs, company now fully entered the market with whole production cycle, benefiting from battlefield testing and feedback. As noted, took a stake in drone-maker Frontline, and is integrating its high-end European components into Frontline's UAVs. This comes with an agreement to scale drone production in Ukraine and fold Ukrainian products into the European defence ecosystem.

Terma (Denmark): launched a joint R&D with Odd Systems to develop anti-drone interceptors, essentially investing engineering time and resources to co-develop new products in Ukraine.

Saab (Sweden): Saab is negotiating local production in Ukraine, focusing on drones, munitions components and sensor technology. [6] The company signed an MoU with Ukrainian firm Radionix on defence electronics, positioning itself for deeper industrial integration.[7]

ARX Robotics (Germany): ground robotics firm ARX Robotics has joined Diia.City and opened an office in Ukraine. The company is preparing to shift part of its production and R&D into the Ukrainian market to scale local defence manufacturing.[8]

Weibel Scientific (Denmark) **&** DefSecIntel (Estonia): the two firms partnered to integrate radar and counter-drone systems, with Ukraine as a key focus. Their cooperation is designed to expand both NATO-linked security projects and Ukrainian defence capabilities.[9]

[6] See "Saab plans to set up production in Ukraine amid growing demand", Reuters
[7] See "Ukraine and Swedish Saab company discuss avionics upgrade for Soviet-era fleet" Ukrainska Pravda
[8] See "German manufacturer ARX Robotics to move part of production to Ukraine" Ain
[9] See "Weibel, DefSecIntel Partner to Integrate Radars, Counter-Drone Systems", DefensePost

Helsing (Germany): Helsing has delivered thousands of loitering munitions to Ukraine and plans large-scale production of HX-2 drones. The company sees Ukraine as its primary market, combining battlefield testing with rapid scaling of strike drone programs.[10]

HENSOLDT (Germany): HENSOLDT secured a €340 million order for TRML-4D and SPEXER radars to strengthen Ukraine's air defence. Discussions with Ukraine's Ministry for Strategic Industries also cover potential deployment of defence production in the country.[11]

Indra Sistemas (Spain): Indra held talks in Kyiv with government and industry partners about supplying advanced radars and electronic warfare capabilities. While concrete contracts are pending, the company is positioning for entry into Ukraine's defence sector.[12]

Kongsberg Defence **&** Aerospace (Norway): Kongsberg signed agreements with Ukrainian partners to co-develop air defence missiles and unmanned surface vessels. The firm is embedding itself into Ukraine's emerging defence production network.[13]

Leonardo (Italy): Leonardo, together with Enav and UkSATSE, signed an agreement to restore Ukraine's air traffic management system. The deal involves radar and ATM technology supply, with potential to expand into broader defence cooperation.[14]

MBDA Deutschland (Germany): MBDA is in discussions with Ukroboronprom on cooperation in counter-UAS and air defence. Possible areas include joint R&D, production and investment, reflecting Kyiv's push to boost local arms manufacturing.[15]

Stark (Germany): The startup Stark maintains a Kyiv office and unveiled a kamikaze drone capable of 100 km autonomous strikes. The company is using Ukraine as a testbed and potential base for scaling advanced unmanned systems.[16]

TEKEVER (Portugal): TEKEVER opened an office in Ukraine, aiming to embed its UAV solutions into the defence ecosystem. The firm is combining frontline support with closer collaboration with Ukrainian partners.[17]

Thales (France): Thales signed three agreements with Ukrainian industry to expand local capacity in EW, tactical communications, UAVs and air defence. This positions Thales as a key contributor to front-line defence integration.[18]

WB Group (Poland): WB Group launched FlyEye production in Ukraine in 2025, moving from servicing Polish systems to full-scale domestic manufacturing. The firm is now embedded in Ukraine's drone industry as a long-term partner.[19]

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[10] See "German company has delivered nearly 2,000 AI-guided kamikaze drones to Ukraine", European Pravda
[11] See "HENSOLDT strengthens Ukraine's air defence", HENSOLDT
[12] See "Spain's Indra Previously Supplied Ukraine with Civil Aviation Systems, Now Eyes Air Defense Support", Defense Express
[13] See "Kongsberg and Ukrainian players to work on missiles and drone boat", Naval Today
[14] See "Leonardo, Enav and UkSATSE sign an agreement to restore Ukraine's Air Traffic Management System", Leonardo
[15] See "Ukrainian Defense Industry JSC starts cooperation with leading manufacturer of missile systems", UkrOboronProm
[16] See "Virtus Drone by Stark: AI, Autonomy, and Swarm Capability Born from Ukraine's War Lessons (Updated)", Defense Express
[17] See "Portuguese drone manufacturer Tekever opens office in Ukraine", Defender media
[18] See " Thales signs three agreements with Ukrainian industry to strengthen front-line support and local defence capability", Thales Group
[19] See " Polish company launches production of FlyEye reconnaissance drones in Ukraine", Ukrainska Pravda

Renault (France): Renault has been in talks with Ukrainian authorities about launching drone production. The company is exploring ways to adapt its industrial base to contribute to Europe's wider defence push.[20]

Foreign dual-use Investors: It's worth noting some dual-use/high-tech foreign investments as well. For instance, Microsoft and Amazon have expanded cloud and AI services in Ukraine, which indirectly supports defence (cloud infrastructure for government, AI for intelligence). While not defence companies, their investments in tech capacity (data centres, training) bolster Ukraine's innovation ecosystem that defence startups rely on. Another example: Bosch (Germany) invested in a new power tool plant in 2023 – not military, but the CNC tools produced can be considered dual-use (and Bosch explicitly cited contributing to Ukraine's economic resilience). Such investments, though civilian, improve the industrial base that defence production depends on.

Overall, foreign direct investment in Ukraine's defence sector, almost non-existent before 2022, is now gaining momentum. The UK, Sweden, Denmark, the Netherlands, and others are all actively investing in Ukraine's defence production capacity (through either direct company investments, joint ventures, or funding for factories). These collaborations bring in much-needed capital and also tie Ukraine's defence industry more closely to Western supply chains, ensuring sustainability.

Also worth mentioning the challenges of direct investments for Ukraine. Foreign companies tend to prefer repair and maintenance and support hubs, rather than full production cycle in Ukraine. This raises questions about dealing with intellectual property rights, so that foreign companies feel more protected sharing its experience with Ukrainian colleagues.

Challenges in attracting financing

Despite the new interest, Ukrainian defence startups and manufacturers face significant hurdles in raising capital:

- Security Risk and Physical Destruction: Active war poses obvious risks to investors. Production facilities near combat zones have been damaged or lost. In the first two years of the full-scale war, major enterprises like Motor Sich (engines) and Antonov (aircraft) suffered $601 million in asset damage from attacks. Many firms had to relocate factories and disperse operations for safety. This heightens investor concerns over asset security and business continuity.
- Secrecy and Security Constraints: Defence production is sensitive. Companies cannot freely disclose details to investors or banks without risking operational security. For example, under the new loan program, only a few vetted banks are authorized to access classified info about defence firms. Some manufacturers are reluctant to reveal factory locations or supply networks (lest they become Russian targets). This opacity complicates due diligence for investors. Bankers still prefer to see the actual location and make sure the company exists, even if anonymously, which is a delicate balance.
- Lack of Track Record: Many defence-tech startups emerged only after 2022, founded by young engineers or IT professionals with no prior financial history. Banks and investors have trouble projecting these newcomers' performance. The war created lots of smaller greenfield companies with no previous financial activity, making credit risk hard to assess. Prior to 2022, Ukraine had few successful defence startup examples to inspire investor confidence – most private firms were small-scale or "off the radar" of traditional VC.
- Profitability and Business Model Issues: Defence manufacturing in Ukraine often yields low margins, which deter investment. For critical products like drones and electronics, the government

[20] See " Dispute Over Drone Production for Ukraine at Renault Exposes russian Footprint in French Trade Unions" Defense Express

caps profit margins (e.g. 25% max for UAV and electronic warfare gear). Even where no formal cap exists, industry insiders report average margins of only ~5–20%. Such low profits make investors worry about returns. Additionally, many startups rely on the Ukrainian government or volunteer units as their main customers, raising questions about payment reliability and long-term market size (especially post-war). These factors make the sector "a risky venture" in the eyes of banks. Additionally, restricted export forces companies to compete on a market limited by state procurement capabilities.

- Fragmentation and Scale-Up Challenges: The explosion of hundreds of small "garage" startups, while innovative, has led to a fragmented ecosystem. Many teams are essentially improvising hardware assembly without deep R&D capacity. This "zoo of solutions" – countless custom drone models, ad-hoc devices – lacks standards and is hard to scale or integrate. Investors fear that few of these small firms can grow into stable, large-scale manufacturers.
- Historical Corruption and Trust Issues: Before the recent reforms, Ukraine's defence sector was known for bureaucracy and corruption, which made Western financiers wary. The state conglomerate Ukroboronprom (now reformed as "Ukrainian Defence Industry" JSC) had a "culture of secrecy, clientelism and corruption" that deterred foreign investment. Although governance is improving (new procurement rules, leadership changes since 2020), investors still require transparency and compliance measures, which younger companies must work to implement to attract funding.

In summary, while wartime urgency has brought in new funding, investors must grapple with an active conflict's risks, information hurdles, and the nascent, unproven nature of many Ukrainian defence ventures.

# LANDSCAPE OF FINANCING OPPORTUNITIES

## International Financial Institutions (IFIs)

International financial institutions (IFIs) have all drawn strict red lines around the direct financing of weapons and ammunition. Yet in the years since Russia's full-scale invasion, several have moved to support the broader security and resilience ecosystem in Ukraine-areas that often overlap with dual-use technologies and industries. The picture that emerges is one of cautious but significant engagement: financing logistics, manufacturing capacity, supply chains, and-perhaps most importantly-risk transfer mechanisms that keep capital flowing despite the war.

The European Bank for Reconstruction and Development (EBRD) has been one of the key financial partners of Ukraine since the full-scale invasion in February 2022—committing €7.6 billion in wartime support by mid-2025 for emergency financing, reconstruction, infrastructure resilience, energy security and trade facilitation programs.[21] However, the Bank's own policies impose clear prohibitions on financing defence-related activities. In its Project Implementation During Armed Conflicts or Wars guidance[22] issued in April 2024, EBRD states that it does not finance activities related to arms or military equipment, and that project scope must not involve works or equipment, including dual-use items, "that could potentially be used for military purposes."

Its policies explicitly exclude support for the manufacture of arms, ammunition, warships or military fighting vehicles. Still, the Bank has pushed into adjacent areas where civilian and defence needs overlap. One of its most innovative measures was a €110 million guarantee program Ukraine Recovery and Reconstruction Guarantee Facility, launched with the insurer Aon, that restarted war-risk insurance for inland transport in Ukraine.[23] By de-risking the movement of cargo, rail and vehicles, EBRD effectively underpinned both civilian trade and the logistics chain on which defence production also depends. The Bank has also continued long-running governance and procurement reforms, such as support to the Prozorro e-procurement system, which are crucial for any future defence-related industrial supply chains to remain transparent and bankable.

The European Investment Bank (EIB) has taken a noticeable step change since 2024, when it declared security and defence a cross-cutting policy objective. EIB has stated that it "aims to ensure Europe's peace and security through its investments in our industrial base, technological superiority and essential defence infrastructure". While it continues to prohibit financing for weapons and ammunition–and, outside the EU, for military or police equipment–the EIB has broadened its understanding of what qualifies as eligible "dual-use" (dropping the 50% revenue from civilian use requirement). On 11 June 2025, the EIB announced that it would triple intermediated financing for SMEs in the EU defence supply chain from €1 billion to €3 billion. As part of that, it entered into a first deal with Deutsche Bank: the EIB gives Deutsche Bank a €500 million loan, which Deutsche Bank will provide credit and working-capital lines totalling about €1 billion to SMEs or mid-capitalisation companies, to cover defence-research, police, military infrastructure etc.[24] The EIB has also supported dual-use technology in space and earth-observation industries, showing willingness to back companies whose products straddle civilian and security applications.

[21] See "EBRD support for wartime Ukraine hits €7.6 billion as Bank commits new funding at Recovery Conference", EBRD
[22] See "Project Implementation During Armed Conflicts or War", EBRD
[23] See "EBRD and Aon launch €110 million war risks insurance facility in Ukraine", Ministry of Economy of Ukraine
[24] See "EIB triples financing for banks to provide liquidity to SMEs in the supply chain of Europe's defence industry, signs first deal with Deutsche Bank", EIB

Unfortunately, this financing does not cover Ukraine, as EIB outlined that "financing for the security and defence industry is only available for companies domiciled and projects implemented inside the EU".[25]

The €175 million Defence Equity Facility (DEF), launched in 2024 by the European Commission and the European Investment Fund, blends €100 million from the European Defence Fund and €75 million from EIF to channel venture capital, private equity, and private credit into European companies developing innovative defence and dual-use technologies, with the goal of mobilising up to €500 million in total investments by 2027.[26] Currently this program does not extend to Ukraine.

The World Bank Group has not funded defence directly but has been central to keeping the Ukrainian economy functional. Its budget support, reconstruction programmes, and financial-sector stabilisation efforts indirectly sustain the environment in which dual-use industry can operate. Within the Group, the International Finance Corporation (IFC) adheres to a strict exclusion list banning investment in weapons and munitions, while there is no clear exclusion of dual-use goods or technologies.[27] IFC has used EU guarantees to expand lending to private-sector manufacturing and infrastructure in Ukraine.[28] The World Bank's most relevant innovation has been through its insurance arm, MIGA. The Multilateral Investment Guarantee Agency (MIGA) extended its political-risk insurance that explicitly covers war-related risks in Ukraine. Backed by donor resources, the programme has enabled guarantees for banks such as BNP Paribas and ING, allowing their Ukrainian subsidiaries to keep lending to companies in manufacturing, logistics and other productive sectors. MIGA maintains its prohibition on projects involving the production or trade of weapons, but by insuring foreign direct investment and loans in high-risk sectors, it has created an essential safety net for dual-use businesses.

## Development Finance Institutions (DFIs) and Export Credit Agencies (ECAs)

Development finance institutions and export credit agencies occupy a complex but essential space in the financing of Ukraine's dual-use economy. Unlike the big multilaterals, many of these actors operate under national mandates, which means their policies on defence and dual-use vary more widely. Some apply blanket exclusion lists; others, like export credit agencies, can and do support defence exports when licensed by their governments. Together, they provide the risk-sharing and liquidity that make it possible for private investors and exporters to stay engaged in Ukraine during wartime.

European DFIs, like DEG, KfW Group (Germany), FMO (Netherlands), Proparco (France), Swedfund (Sweden), Finnfund (Finland) and Norfund (Norway) (15 members in total) are bound by the harmonised EDFI Exclusion List, which prohibits financing for weapons and munitions, in case if such products form a substantial part of a project's primary financed business activities (more than 10%).[29] The EDFI list does not explicitly mention dual-use goods: if the project has a legitimate civilian rationale, it may be eligible, but if it primarily supports military, it falls under the weapons exclusion. In the context of an ongoing war in Europe, the 10% threshold for defining defence activity appears irrelevant, as it excludes companies whose primary mission is to support national defence rather than pursue commercialisation.

[25] See "Strengthening Europe's security and defence industry", EIB
[26] See "The European Commission and the European Investment Fund join forces to boost investment in defence innovation through the Defence Equity Facility", EIF
[27] See "Less Damage Done? Finding the Good in Dual-use Technology", VentureESG
[28] See "EU and IFC to Unlock Over €500 Million in Private Sector Investments for Reconstruction in Ukraine", IFC
[29] See "Harmonized EDFI Exclusion List", EDFI

Since 2022, members of the European Development Finance Institutions (EDFI) network have supported Ukraine primarily through investments in finance, energy resilience, agriculture, IT, and SME recovery, but nothing related to defence or dual-use. Examples include FMO's emergency support for Ukrainian agribusiness[30] and renewable energy clients, Proparco's trade-finance guarantees[31], Swedfund's investment in Horizon Capital's fund for Ukrainian and Moldovan tech SMEs[32], and Norfund's dedicated Ukraine mandate under Norway's Nansen Programme[33].

In other regions, EDFI members have financed projects that could be classified as dual-use because they strengthen resilience in areas like cybersecurity, ICT, and logistics. For instance, DEG backed Liquid Telecommunications, a pan-African fibre-optic and cybersecurity provider[34], and Swedfund invested in funds targeting IT and export-oriented companies in Eastern Europe and logistics networks in Africa.[35] Still, the pattern shows that EDFI institutions are cautious in selecting such targets: these projects are framed around civilian connectivity, data security, and economic growth rather than military use. But according to their policies they can still support, for example, manufacturers of electronics, software, or industrial equipment that may later be used in dual-use contexts, as long as the primary revenue model is civilian.

Bank Gospodarstwa Krajowego of Poland (BGK) plays a major role in financing Poland's defence sector. BGK's 2025–2030 Strategy includes security as a key objective. BGK manages national guarantee and co-financing schemes and serves as a conduit for EU instruments like InvestEU and the Ukraine Facility. Since 2022, BGK has been heavily engaged in guarantees for Polish companies operating in Ukraine, especially in partnership with KUKE. It has taken on war-risk exposure for projects ranging from machinery exports to construction and logistics, effectively underwriting industrial cooperation between the two countries.

In contrast to many European financial institutions that maintain strict prohibitions on defence or dual-use financing, BGK (Bank Gospodarstwa Krajowego, Poland's national development bank) has taken a more open and strategic approach. Its 2025–2030 strategy explicitly identifies "investment in defence – debt financing for defence companies" as one of the bank's business priorities. Also, BGK's strategy includes financing of the Polish Armed Forces development.[36]

A telling example is BGK's backing of ICEYE, a Finnish company developing synthetic aperture radar (SAR) satellites. The bank described ICEYE as "a good example of dual-use technology" because its satellites provide critical data for agriculture, environmental monitoring, and crisis management, while also offering capabilities relevant to defence and security.[37] BGK has no limitations on financing of defence and dual-use investments in Ukraine, but thus far no experience in the field.

Kreditanstalt für Wiederaufbau (KfW): plays an increasing, yet carefully managed, role in the security and defence industry. KfW has financed defence-related projects in Germany. KfW's financing was primarily focused on dual-use technologies. Purely military projects were often avoided or handled carefully. More recently, KfW took equity stakes in Germany's key defence companies. KfW provides targeted loans, equity financing, and participation in government-led defence funds. KfW financing of defence projects abroad is restricted.

[30] See "FMO's investments in Ukraine", FMO
[31] See "EBRD joins with BII and Proparco to support trade in Ukraine", EBRD
[32] See "Swedfund invests USD 15 million into Horizon Capital Growth Fund IV to back leading high-growth tech and export-oriented companies in Ukraine and Moldova", Swedfund
[33] See "Norwegian Government allows Norfund to invest in Ukraine", The Norwegian Government
[34] See "Liquid Telecommunication's bond subscribed by DEG", DEG
[35] See "African Infrastructure Investment Fund 4", Swedfund
[36] See "BGK Strategy 2030", BGK
[37] See "Vinci Fund invests in Earth monitoring from space", BGK

National Development Bank of the Czech Republic (NRB): plays a key role in supporting the country's defence industry through various financial instruments. NRB offers state-backed bonds and long-term loans for capital-intensive defence projects. NRB enables commercial banks to offer defence manufacturers low-cost, long-term financing. NRB's subsidiaries provide instruments like equity and mezzanine funding as well as export finance. NRB has no limitations on financing of defence and dual-use investments in Ukraine, but thus far no experience in the field.

Cassa Depositi e Prestiti (CDP) invests in the defence and security sector in Italy, under strict conditions. Its policy excludes any involvement with controversial weapons such as nuclear, chemical, biological, depleted uranium, cluster munitions, and anti-personnel mines, as well as cyber weapons designed for offensive attacks. Conventional arms, small arms, and light weapons may be supported in controlled circumstances, for example if used exclusively by armed forces or police, for R&D that reduces environmental or social impact, or if marketed within the EU. CDP also screens counterparties, end users, and countries: it only engages with governments or authorised entities, avoids end users that might misuse assets, excludes countries under arms embargoes or those with active armed conflicts, human rights violations, or high corruption risk, and requires counterparties to comply with treaties and regulations.

A different picture emerges when we look at export credit agencies (ECAs). These institutions are instruments of state policy, and they operate explicitly to promote exports, including in the defence sector where governments allow it. The UK's UKEF has been unusually transparent: it publicly allocates a portion of its Direct Lending Facility to defence, and in 2023–24 confirmed a £3.5 billion cover limit for Ukraine, open to licensed defence and dual-use exports.[38] Bpifrance Assurance Export, which manages France's export-credit functions, also covers aerospace, naval, telecoms, and defence deals, subject to French government licensing.[39] In both cases, the door is open for dual-use exporters so long as the relevant export licenses are in place.

The ECAs of Central Europe have been particularly active in Ukraine. Poland's KUKE pioneered war-risk insurance for Polish investors and in 2024, together with MIGA, launched a co-insurance framework that led to the first insured Polish production complex in Ukraine.[40] Czechia's EGAP created a dedicated Ukraine Fund that provides favourable terms for exporters, with repeated government top-ups ensuring continuity, while it is not clear if dual-use or defence goods are allowed. [41]

EIFO (the Danish Export **&** Investment Fund) has launched several initiatives to support Ukraine's defence-technology sector. Notably, it has created an investment guarantee scheme (budget ~ DKK 1 billion) that covers up to 70% of the purchase price for Danish companies investing in Ukrainian defence or security firms. In addition, EIFO has made a direct equity investment of US$5 million into *D3*, a venture fund focused on early-stage defence tech startups in Ukraine (and allied countries), dealing with things like drones, sensors, de-mining, and AI.

The U.S. International Development Finance Corporation (DFC) positions itself as a financial institution with a goal to partner with private sector to strengthen national security. It supports private sector investment in higher risk markets, while adhering to binding constraints in its Environmental & Social Policy and Procedures (ESPP). Its Appendix A defines categorical exclusions—including projects whose primary business is military production or sales, which rules out direct support for pure arms manufacturing.[42]

[38] See "Policy paper: UK support to Ukraine: factsheet", UK Government
[39] See "Bpifrance, a key player supporting the French defence industry through its insurance, financing, investment and advisory tools to promote innovation, exports and growth", Bpifrance Assurance Export
[40] See "KUKE and MIGA insure Polish investment in Ukraine", KUKE
[41] See "Ukraine Fund", EGAP
[42] See "Environmental and Social Policy and Procedures", DFC

Nonetheless, DFC retains flexibility to back dual-use and defence-adjacent supply chains. In 2024, DFC committed over $580 million to support Ukraine's recovery, including $210 million in political risk insurance for water infrastructure, war-risk reinsurance, and agricultural operations.[43] While there was no evidence on dual-use projects in Ukraine, its policy allows to finance the sector, excluding "primary military production" entities.

Finally, the U.S. Export-Import Bank (EXIM) is legally prohibited from financing defence articles and services, but it has carved out a significant dual-use exception. Under this rule, exports that are non-lethal and primarily civilian in purpose can be supported, provided they are monitored and reported. [44] U.S. EXIM has formally allied with 13 ECAs to support Ukraine, but it is focused on recovery rather than dual-use or defence.[45]

European DFIs maintain strict exclusion policies that prevent direct support for military production. To date, there is no public evidence of their direct involvement in dual-use financing, although several have supported adjacent sectors such as ICT, energy resilience, and advanced manufacturing. ECAs like UKEF, Bpifrance, KUKE, EGAP and OEKB are explicit state vehicles for export and investment support, and in several cases have developed Ukraine-specific windows or war-risk facilities. BGK adds a unique blend of development banking and guarantee provision, bridging EU instruments with national strategy.

For Ukraine's dual-use sector, this means there is no single tap of financing, but rather a patchwork of instruments. If projects are framed around civilian end-use, compliance, and resilience, and backed by the right guarantees or insurance, then DFIs and ECAs are already willing to engage, even in wartime.

## Emerging Opportunities

Recent developments suggest that financial institutions are beginning to establish new programmes to support the financing of dual-use goods. While some of these mechanisms are already in operation, further programmes are expected to emerge in the near term.

### NDI4Ukraine (NDI4U)

The project is implemented by the EU in close cooperation with the European Commission and the Government of Ukraine. The strategic goal of the initiative is to provide Ukraine's much-needed liquidity to support priority state social expenditures (healthcare, education, housing) and to finance the state's contribution to the share capital of the National Development Institution (NDI). The latter will function as a sustainable institutional base for the long-term financing of the economy to support companies operating in strategic industries, particularly emerging and disruptive technologies.

The total volume of the Project is nearly EUR 221 million, which includes a loan in the amount of EUR 140 million under a 100% EU guarantee (UIF), an investment grant from the EU in the amount of EUR 21 million, as well as a blended finance program in the amount of EUR 59.5 million to create revolving SME support mechanisms within the NDI. The loan and grant are provided to finance the budget gap arising from the capitalization of the NDI and are paid in two tranches, while the UIF guarantee covers the principal and interest payments, which is key to structuring the loan without additional pressure on the budget.

[43] See "DFC Expands Global Impact With Record-Breaking Investments in Fiscal Year 2024", DFC
[44] See "EXIM Bank policies – Military", U.S. EXIM
[45] See "Export-Import Bank of the U.S. Pledges Support for Ukraine with Memorandum of Understanding Alongside 13 Global Export Credit Agencies", U.S. EXIM

It is expected that within NDI4U, the mobilization of funds from partner financial institutions and the private sector will amount to approximately EUR 80 million. This will increase the total investment of the Project to EUR 301 million, ensuring a transition to a sustainable financing model through risk-sharing instruments and the integration of Ukraine's financial system into EU standards.

## Bpifrance Ukraine Risk Mitigation & Financing Programme for Dual-Use and Strategic Investments

This is a strategic initiative that, through the Ukraine Investment Framework (UIF) mechanisms, aims to mobilize EUR 578.6 million in total investments (including private capital). Financial support is based on Bpifrance instruments totalling EUR 478.6 million, which include investment insurance (EUR 200 million), buyer credits (EUR 228.6 million), and equity investments (EUR 50 million). The project is supported by an EU package of EUR 163 million, covering a guarantee limit (EUR 150 million), investment grants, and technical assistance.

A separate priority is given to Dual-use technologies. Through the EuroQuity platform and the "European Defence Alliance" initiative, a three-year perspective involves the screening of 200 companies and their preparation for investment. Collaboration with the Brave1 cluster integrates Ukrainian solutions into the value chains of European leaders (Airbus, Leonardo, Thales) and attracts capital from leading funds (OTB, Eurazeo). Adherence to ESG standards and reporting within the OPSYS system will ensure high bankability and project transparency.

The total volume of the established portfolio amounts to EUR 206.5 million, where the key priority is dual-use technologies totalling EUR 141.5 million. Currently, the Funded Pipeline (EUR 126.5 million) includes projects in security and robotics (EUR 38.5 million: firefighting robots, anti-UAV systems, acoustics), digital infrastructure (EUR 50 million: FTTH networks), and energy and industry (EUR 38 million: thermal batteries, eco-generators, and production modernization). Additionally, EUR 10 million is allocated to support startups through a venture fund, and EUR 70 million is designated within the Unfunded Pipeline for further technological development.

## Strategic Investment and Support for Ukraine Facility (SISU)

This is a strategic instrument for supporting Ukraine's recovery, designed to mobilize private investment in vital sectors: energy, digital infrastructure, logistics, critical raw materials, and industrial modernization. The project is implemented by the Finnish state agency Finnvera and the Ministry for Foreign Affairs of Finland within the Ukraine Investment Framework (UIF) as a Team Europe initiative contributing to the Global Gateway strategy.

The financial architecture of SISU is built on an 80/20 risk-sharing model, where the EU guarantee covers EUR 180 million and the co-risk of the Government of Finland accounts for EUR 45 million. This provides EUR 225 million in credit financing (up to 85% of project costs), while private Ukrainian corporations, as the primary beneficiaries, provide at least 15% of their own equity (EUR 40 million). The instrument is implemented through three complementary schemes: direct buyer credits, bank guarantees, and investment insurance against political risks. Finnvera serves as the project's financial institution, bringing successful experience in executing complex transactions in Ukraine within the metallurgy and telecommunications sectors with tickets exceeding EUR 30 million, ensuring reliable portfolio management in high-risk environments.

Currently, the instrument is at an advanced stage of preparation: a total project pipeline of approximately EUR 500 million has been identified, of which EUR 295 million consists of directly processed projects. This

portfolio includes strategic initiatives in the mining, metallurgy, and energy sectors (EUR 210 million), as well as digital solutions for telecommunications (EUR 50 million). The dual-use sector within the credit portfolio is represented by projects totalling EUR 35 million, covering the production of quick-assembly protective hangars, filtration systems, and satellite technologies. Separately, a EUR 30 million grant component is provided to finance early-stage dual-use startups through the BRAVE1 platform, enabling the mobilization of additional investment in innovation. The deployment of the first 40% of the portfolio is planned for 2026, immediately following the finalization of intergovernmental agreements and approval by the UIF Steering Board.

### SISU Venture Facility

This is a strategic blended finance initiative with a budget of EUR 30 million, funded by the European Union (DG NEAR/ENEST) and implemented through the mediation of the Ministry for Foreign Affairs of Finland to stimulate the Ukrainian venture ecosystem in the strategic dual-use technology sector.

The program is aimed at overcoming the critical capital deficit at the riskiest early stages (pre-seed and seed), where non-commercially assessable military risks hinder the active involvement of private investment. The key mechanism of the program is the provision of repayable grants ranging from EUR 300,000 to EUR 5 million per fund management company, which act as a non-commercial risk absorption instrument, allowing private venture funds to enter projects at earlier stages and ensuring a cumulative private capital leverage of 3X the public contribution.

The project is implemented in partnership with the Ukrainian competent authority BRAVE1, and the investment focus is concentrated on areas such as AI, anti-UAV systems, maritime drones, and robotic systems, while activities are strictly limited to civil-defence innovation, and the production of weapons and ammunition is entirely excluded. Management is based on rigorous ex-ante and ex-post controls by the governments of Finland and Ukraine, and all funds returned by portfolio companies in the event of their commercial success are directed to a special Trust Fund for reinvestment into Ukraine's innovative economy. The program stimulates sustainable recovery through the creation of high-tech jobs and adheres to the EU "Do No Significant Harm" (DNSH) principles and Official Development Assistance (ODA) standards, according to which any military use of technology must be only secondary or indirect.

### BGK

This is a portfolio-based lending and guarantee framework implemented by BGK, targeting eligible private sector investments in Ukraine. The financial architecture of the programme is based on a pari passu EU Guarantee covering up to 90% of eligible BGK loans, with a maximum guarantee amount of EUR 175 million. This coverage level is determined by binding agreements with the Polish State Treasury, which underpin BGK's financial plans and are calibrated at a 10% risk level. The programme is complemented by a technical assistance component of EUR 8.75 million aimed at supporting project preparation, implementation capacity, and compliance with EU standards.

The operational focus prioritizes capex-backed investments in productive assets and infrastructure. Refinancing of existing debt is permitted only on a limited and exceptional basis, strictly where it facilitates new capital expenditure. Acquisition loans are considered sensitive transactions and are eligible for the EU Guarantee only when the acquisition is carried out by an EU-controlled entity within Ukraine's jurisdiction and demonstrably supports recovery objectives. Such transactions are subject to prior Commission non-objection and enhanced scrutiny regarding ownership, control, and strategic rationale to ensure real-economy impact rather than purely balance-sheet transitions.

The programme is fully aligned with the Ukraine Facility objectives and contributes to EU priorities, including strengthening economic resilience, modernizing critical infrastructure, and fostering Ukraine's integration into EU value chains, specifically in strategic and dual-use sectors. Given the prevailing war-related risks and limited availability of long-term financing, this risk-sharing instrument remains essential to crowd in private capital and enable critical investment decisions in Ukraine.

### NRB

The Ukraine Recovery Guarantee programme, with a EUR 100 million budgetary guarantee under the UIF, is implemented by the Czech development bank NRB to establish a portfolio-based lending and guarantee framework. The initiative is designed to support the recovery, reconstruction, and modernization of Ukraine by targeting eligible private sector investments. The financial architecture provides a pari passu EU Guarantee covering up to 80% of eligible loans, where the lenders are partner banks or participants in syndicated loans, with a total guarantee cover limit of EUR 100 million.

The operational model prioritizes investments backed by capital expenditure (CAPEX) in productive assets and infrastructure, specifically within strategic industries and projects involving dual-use technologies. Refinancing of existing debt is permitted only on a limited and exceptional basis to facilitate new investment, primarily acting as bridge financing for shareholder loans or equipment payments pending permanent long-term funding. This flexibility ensures that NRB can provide critical financial support at the earliest possible stages of project development.

Implementation is conducted through eligible financial intermediaries, including banks established in Article 11 countries (retaining at least 20% of the risk) and the Czech Export Bank (retaining a minimum of 2.5% of the risk as per applicable legislation). The programme actively fosters EU–Ukraine industrial cooperation, technological exchange, and the integration of cross-border value chains. By enabling indirect lending through syndications, the instrument mobilizes broader financial partnerships to drive sustainable economic recovery and modernize Ukraine's strategic industrial base.

## NATO & EU Innovation Programs

Beyond the large financial institutions and export-credit agencies, a newer layer of innovation-oriented programmes has emerged to bridge the gap between early research and investable scale-up in dual-use technologies. These instruments are smaller in absolute volume but highly relevant to Ukraine's ecosystem, because they operate at the technology frontier and are explicitly designed for dual-use or security applications.

The NATO Defence Innovation Accelerator for the North Atlantic (DIANA) is the most visible of these efforts. Launched in 2022, DIANA connects a network of more than twenty accelerators and test centres across the Alliance, with a mandate to nurture dual-use technologies that meet NATO's strategic priorities. It provides non-dilutive grants, challenge-based competitions, and access to testing facilities, helping young companies validate prototypes and de-risk technologies at Technology Readiness Levels 4–7. DIANA does not invest equity or provide large volumes of capital, but it gives something just as valuable in early stages: credible defence validation and access to military end-users. For Ukrainian dual-use firms, being selected into a DIANA cohort signals both technical relevance and political legitimacy, which can later unlock commercial or institutional investors.

The DIANA programme is designed to support dual-use innovation, focusing on technologies that serve both civilian and defence or security applications. Purely military projects with no civilian use are not eligible. Participation is limited to incorporated companies based in NATO member states, which must be majority-

owned by Allied nationals, while universities and non-profits cannot apply directly. Selected innovators receive €100,000 in initial funding before entering Phase 1 of the accelerator, covering six months of development and mandatory travel. Those who advance to Phase 2 may obtain up to an additional €300,000, bringing total potential support to €400,000. Importantly, intellectual property remains with the innovators, as DIANA does not take equity or ownership.

The programme operates through Challenge Calls in priority technology areas. Successful applicants enter a two-phase Accelerator: Phase 1 offers training, mentoring, networking, and access to NATO's network of test centres; Phase 2 provides deeper, tailored support focused on commercialization and investor engagement. Beyond funding, DIANA provides business development support, mentorship, investor connections etc.

Complementing DIANA is the NATO Innovation Fund (NIF), a €1 billion venture capital vehicle backed by 24 Allies. Unlike DIANA's grant-style support, NIF deploys equity and venture funding tickets ranging from €2–15 million into deep-tech companies whose products touch on defence, security, and resilience. Its investment theses explicitly cover areas like autonomous systems, energy resilience, space, and advanced manufacturing. The fund has already made early investments in unmanned aerial systems and sensing technologies, making clear that NATO sees dual-use drones and autonomy as central to future security.

While the NIF does not explicitly state its policies on dual-use technologies, its investment areas encompass sectors such as artificial intelligence, autonomy, quantum technologies, biotechnology, and energy, which often have dual-use applications. Therefore, technologies with both civilian and military applications may be eligible for funding, provided they align with the NIF's focus areas and responsible investment criteria.

The NIF has invested in a diverse range of companies across various sectors, including TEKEVER, a leader in AI-enabled Unmanned Aerial Systems (UAS), providing Intelligence-as-a-Service for both civilian and military applications and Isar Aerospace, launching small and medium-sized satellites to ensure flexible and cost-efficient access to space for governments and institutions. These investments reflect the NIF's commitment to supporting innovative technologies that enhance the defence, security, and resilience of NATO nations.

For Ukraine, NIF represents both a potential direct investor and a signalling mechanism: attracting NATO-backed VC implies that the technology is relevant for allied defence ecosystems. Ukrainian companies can potentially access NIF funding, but with some caveats. Ukraine is not a full NATO member but participates in partnership programs, allowing Ukrainian startups to be considered under certain conditions or through international collaborators. Another route is via joint ventures or collaborations with NATO-country companies that already have direct access. Direct access may be limited, but through partnerships, Ukrainian startups can still secure funding and support.

On the European side, the European Innovation Council (EIC) Accelerator under Horizon Europe plays a different but complementary role. It provides a mix of non-dilutive grants (€0.5–2.5 million) and blended finance packages that combine grants with equity (up to €15 million), targeting companies at TRL 6–8 that are close to commercialisation. Unlike most IFIs and DFIs, the EIC explicitly accepts dual-use framing, as long as projects demonstrate strong civilian applications. The programme has supported hundreds of European firms in areas like advanced materials, AI, robotics, and energy storage–all highly relevant to defence applications. The EIC is especially valuable for Ukrainian start-ups that can form consortia with EU partners, because it bridges the so-called "valley of death" between prototype and scale-up.

Applicants from EU Member States and Horizon Europe associated countries:

- Single start-ups or SMEs, including spin-outs

- Small mid-caps (up to 499 employees) that need rapid scale-up of their TRL 9 activities; mid-caps can apply for investment only
- Individuals or legal entities intending to establish an SME or mid-cap

Applicants from third countries:

- They may relocate their company to an eligible country in order to apply; this relocation must be completed before submitting the full application
- Applicants from the United Kingdom can apply only under the "grant only" scheme

The EIC Accelerator has supported various innovative projects. For example, in a recent funding round, companies such as Brineworks and MOA Biotech were selected to receive support for their breakthrough technologies.

Together, DIANA, NIF, and the EIC Accelerator show that dual-use innovation finance is evolving into a distinct ecosystem. Where the big IFIs shy away from defence and the ECAs only step in once exports are ready, these programmes operate in the messy middle – early-stage innovation, testing, and venture investment. They represent not just sources of money, but also legitimacy and access: acceptance into a DIANA challenge, a term sheet from NIF, or a Horizon/EIC grant all serve as validation signals that can de-risk later funding from banks, DFIs, or ECAs.

## Risk sharing

Financing dual-use and defence projects in Ukraine is ultimately a question of risk allocation. Commercial banks and private investors face exposures that are far higher than in other markets: war risk, political risk, regulatory uncertainty, sanctions compliance, foreign-exchange volatility, and opaque procurement. No single actor can carry these risks alone. The only way capital flows is through structured risk-sharing – where governments, IFIs, DFIs, ECAs and donors absorb part of the downside to unlock private money.

War and physical destruction risk. The defining risk in Ukraine is the possibility of conflict-related loss. Standard insurance markets collapsed after 2022, leaving a gap that had to be filled by public institutions. Instruments like MIGA's SURE Trust Fund, DFC political-risk insurance, and KUKE's war-risk cover directly target this problem. By backstopping investments and loans against destruction, expropriation, or political violence, these schemes make it possible for firms to build factories, set up logistics hubs, or lend into high-exposure regions.

Moreover, given the unprecedented risk of physical destruction, many companies avoid partnerships even when they could be highly profitable. This reflects a deliberate caution in sharing sensitive information with third parties, as firms seek to minimise exposure and protect operational security.

Liquidity and working-capital risk. Defence orders are often irregular and payment terms extended, while manufacturers must still finance wages and materials. To bridge this, IFIs such as EBRD and EIB may deploy portfolio guarantees with local banks, so Ukrainian SMEs can access working-capital lines without collateral. These risk-sharing frameworks lower the capital banks must allocate to loans, making it viable to support suppliers who otherwise look too risky.

Technology and compliance risk. Dual-use firms also face challenges with certification, export controls, and proving civilian applications. Donor-funded grants (Brave1, USF, EIC Accelerator) act as first-loss capital – absorbing the riskiest stage of prototype development. Independent validation from NATO DIANA or EIC helps reduce perceived compliance risk for later investors, effectively derisking technology readiness and regulatory acceptance.

Foreign-exchange risk. Ukraine's hryvnia volatility adds another layer. Some facilities, like EIB's EU-guaranteed intermediated loans, are structured in euros but disbursed via local banks, shielding borrowers from FX swings. ECAs can also guarantee contracts denominated in foreign currency, passing the FX risk to the guarantor.

Governance and procurement risk. Investors worry about opacity and corruption in defence procurement. Risk is reduced through framework contracts, milestone-based payments, and escrow arrangements, which prevent suppliers from carrying open-ended exposure. IFIs also insist on compliance programs (KYC, sanctions screening, end-use certificates), turning governance into a form of risk mitigation.

Taken together, these mechanisms create a layered system:

- Insurance and guarantees transfer extreme risks (war, political violence, default).
- First-loss grants and donor capital absorb technology and compliance risk.
- Portfolio guarantees make banks willing to extend liquidity.
- Framework contracts and escrow discipline public procurement.
- Export-credit products cover buyer and FX risks.

The result is not to eliminate risk – which is impossible in wartime Ukraine – but to distribute it across multiple actors, each absorbing the part they are best placed to handle. For dual-use firms, understanding and assembling this mosaic of de-risking tools is the key to unlocking finance.

# LEGAL FRAMEWORK FOR FINANCING DUAL-USE GOODS

## Terminology

Dual-use goods are goods, software, and technologies that are typically used for civilian purposes, but may also have military applications or be used for the development, production, or use of weapons of mass destruction, their delivery systems, or in terrorist acts. This also includes certain services (technical assistance) directly related to such goods.

In Ukrainian legislation, the concept is defined by the Law of Ukraine "On State Control over International Transfers of Military Goods and Dual-Use Goods":

- Dual-use goods are certain types of products, equipment, materials, software, and technologies not specifically intended for military use, as well as related services (technical assistance) that, in addition to civilian use, may also be used for military or terrorist purposes, or for the development, production, or use of military goods, weapons of mass destruction, their delivery systems, or nuclear explosive devices, including certain types of nuclear materials, chemicals, bacteriological, biological, and toxic agents, as determined by the Cabinet of Ministers of Ukraine.
- Dual-use services (technical assistance) means the provision of technical support to foreign legal entities or foreigners in Ukraine or abroad, related to the repair, development, production, use, assembly, testing, modification, modernization, maintenance, including author's and warranty supervision, or any other servicing of systems, equipment and their components, software, and technologies subject to state export control. Such services (technical assistance) may take the form of instruction, advanced training, education, practical training, or consultancy and may include the transfer of technical data.

In the EU legal environment, the concepts are defined in Regulation (EU) 2021/821 of the European Parliament and of the Council:

- Dual-use goods are goods, including software and technology, that can be used for both civilian and military purposes, as well as goods that may be used in the design, development, production, or use of nuclear, chemical, or biological weapons or their means of delivery, including all goods that can be used for both non-explosive purposes and for any assistance in the production of nuclear weapons or other nuclear explosive devices.

However, in the current Ukrainian context, the line between civilian and defence innovation is becoming increasingly blurred, particularly for private companies developing dual-use technologies such as artificial intelligence, robotics, or autonomous systems. Even if a company's current portfolio consists entirely of military technologies due to wartime needs, this does not automatically make it a defence enterprise in terms of structure, legislation, or long-term strategy, especially if its core capabilities remain dual-use or commercially applicable.

In practice, however, such companies in Ukraine often face the same restrictions and regulations as defence enterprises, including limited access to financing, risk insurance, and investment instruments, since their activities are considered higher risk and trigger broad exemptions under classification systems.

## The Investor Route

According to current legislation, the investor route for defence and dual-use enterprises does not significantly differ from the general mechanism for other types of enterprises. Additional checks are required

if a company's technologies are classified as state secrets or if there is an intangible export (technology transfer).

Currently, the maturity level of most companies is insufficient for equity investments. It is recommended to focus on 5-7-9 loans and grants. The mechanism should exclude direct interaction and access to complete company data; instead, a Ukrainian intermediary should be used.

1. Registration Procedures

For dual-use companies, a standard registration procedure applies without special requirements. At the same time, the origin of funds and ultimate beneficiaries are carefully checked for compliance with sanctions legislation (Law of Ukraine "On Sanctions"), anti-money laundering and counter-terrorist financing legislation (Law of Ukraine "On Prevention and Counteraction to Legalization (Laundering) of Proceeds of Crime, Terrorist Financing and Financing of Proliferation of Weapons of Mass Destruction"), and ties with the aggressor country.

Registration procedures for foreign investors differ from domestic investors only regarding corporate account opening and registration of foreign investments (handled through a servicing bank). In the case of equity investments, changes must also be registered in the state register.

2. AMCU – Economic Concentration

Large investment transactions (mergers, acquisitions of shares in companies) are subject to antitrust regulation under the Law of Ukraine "On Protection of Economic Competition" and the AMC's Order "On Approval of the Regulation on the Procedure for Consideration of Applications and Cases on Concentration of Business Entities", which may require a separate permit.

However, during the period of martial law and 90 days after its termination, merger clearance is not required if the concentration is carried out for the development and production of military and dual-use goods in Ukraine, provided that:

1. The final recipients or users of the products are exclusively the Armed Forces of Ukraine, law enforcement agencies, military formations, the Special Communications Service, military administrations, or other bodies that combat terrorism or ensure defence
2. Such goods or technologies are not produced in Ukraine, or the existing production volume is insufficient for defence needs
3. The investor (buyer of the controlling stake) is already engaged in defence or dual-use activities—producing, purchasing, or developing military products or services.

3. Banks – Financial Monitoring (KYC, AML). Banks and other primary financial monitoring entities must conduct due diligence of customers, including identification, verification, and analysis of sources of funds. Financial transactions exceeding UAH 400,000, or transactions with signs of risk, are subject to mandatory financial monitoring. Violations may lead to suspension of transactions or freezing of assets (Law of Ukraine "On Prevention and Counteraction to Legalization (Laundering) of Proceeds of Crime, Terrorist Financing and Financing of Proliferation of Weapons of Mass Destruction").

4. Intangible Exports, Technology Transfer. If a company possesses controlled technologies, approval from the State Export Control Service of Ukraine (SECU) is required (one-time technology transfer permit). Technology transfer control functions as export control, similar to trade procedures. If developments fall under the TCA, foreign investors cannot gain access. Access to state secrets is granted in exceptional cases on the basis of Ukraine's international treaties with the consent of the Verkhovna Rada or the President.

5. Restrictions. Currently, there are no specific restrictions for investment in defence or dual-use companies beyond general restrictions applicable to all sectors under antitrust law and sanctions legislation (Law of Ukraine "On Sanctions"). These apply to large and monopoly companies, as well as persons on sanctions lists or representatives of aggressor countries (Russia, Iran, Belarus).

6. Risks. Ukraine's interests in defence and dual-use production are protected through financial monitoring and currency control, bans on technology and dual-use exports, restrictions on state secrets, and antitrust legislation. Additional measures are necessary to prevent the dissemination of confidential information. The mechanism used in the 5-7-9 loan program for the defence industry is optimal: financing is provided through a limited number of banks that do not have full access to information about the counterparty.

Suggestions:

- Financing should be conducted through structures already involved in defence sector financing, similar to the 5-7-9 mechanism.
- All necessary technologies should be subject to restricted access (EITI or similar framework) to limit investor access to sensitive information.

## Specific Regulations of Financing Defence and Dual-Use

1. General Regulation of Investments

The key legal framework for investment activity in Ukraine is the Law of Ukraine "On Investment Activity" (September 18, 1991, No. 1560-XII), which establishes the general legal, economic, and social conditions for investment by both Ukrainian and foreign entities. This law does not provide for special restrictions or additional requirements for companies engaged in defence or dual-use technologies.

For foreign investors, the Law of Ukraine "On the Regime of Foreign Investment" (March 19, 1996, No. 93/96-VR) applies. It ensures a national regime for foreign investors and establishes guarantees, including protection against nationalization and requisition (except in extraordinary circumstances) and the right to compensation for losses caused by unlawful actions of state authorities.

Previously, foreign investment was subject to mandatory state registration to obtain benefits and guarantees. However, Law No. 1390-VIII (May 31, 2016) abolished this requirement to simplify procedures. Today, control over foreign investment is exercised indirectly, mainly through statistical reporting. Importantly, the Law does not establish special restrictions on the forms of foreign investment or objects of investment, including for enterprises producing dual-use goods.

2. State Secrets

Relevant legislation:

- Law of Ukraine "On State Secrets"
- SBU Central Department Order No. 383 of 23.12.2020 "On Approval of the Code of Information Constituting State Secrets (CICS)"

Information on defence or dual-use production is not automatically classified as a state secret. However, specific categories of information fall under the CICS, for example:

- 2.10.1 — information on formulas or technologies for producing military materials
- 1.10.3 — information on dual-use technologies superior to foreign analogues, if disclosure enables reproduction or reveals operational characteristics
- 2.2.7 — information on the construction of defence industry enterprises (location, purpose, production capacity for weapons or components)

- 2.7.5 — information on R&D results related to control systems for military launch vehicles, the leakage of which threatens national security.

If information is classified, it is regulated under the Law "On State Secrets" which introduces restrictions: access only with SBU clearance, prohibition of unauthorized disclosure or transfer (including to international partners), and possible travel restrictions for employees with clearance. Foreigners and stateless persons may be granted access only in exceptional cases, based on ratified international treaties of Ukraine or by Presidential order, considering national security needs.

Companies working with classified information must obtain a permit for handling state secrets and establish a dedicated classified unit.

3. Business Development Fund (BDF) The Business Development Fund (BDF) is a state financial institution supporting the financing of micro, small, and medium-sized enterprises (MSMEs) in Ukraine on affordable terms. Its mission is to provide access to financial resources, advisory services, and programmatic support to stimulate private sector growth, job creation, and competitiveness.

The BDF is financed from funds provided by international financial organizations, foreign states, and international technical assistance. These resources are distributed through the BDF, administered by the Ministry of Finance, and allocated via commercial banks licensed by the NBU that have cooperation agreements with the Fund. Enterprises obtain funds directly through these banks.
4. Intangible Exports (SECU Regulation of Investments). Although current direct exports of weapons from Ukraine are limited, the system regulates three main categories:

1. Exports of final products — e.g., armoured vehicles, rocket systems, artillery, communication equipment, ammunition, UAVs, EW systems.
2. Exports of technology, documentation, and R**&**D — e.g., design or technical documentation, engineering services, production licenses abroad, participation in R&D projects, military software.
3. Exports of dual-use goods, components, and innovative equipment — materials, technologies, and equipment that can serve both civilian and military purposes; cooperative components integrated into international supply chains.

Companies intending to produce or trade in defence or dual-use goods must obtain the appropriate licenses from the Ministry of Economy, which relies on the conclusions of the State Export Control Service of Ukraine (SECU) regarding compliance with the export control regime.

If an investor acquires a stake in a company holding classified or controlled technologies, SECU may require permits even for internal information transfers. Thus, a foreign investor may own shares but access to technical documentation is only possible after formal authorization.
The Law of Ukraine "On State Control over International Transfers of Military and Dual-Use Goods" (No. 549-IV, 2003) explicitly defines international transfers to include not only goods but also technologies and software, including those transferred in intangible form. Export control therefore extends to:

- transmission of drawings, documentation, or instructions
- transfer of source code or software
- consultations, training, or knowledge transfer abroad
- sending technical data by email, cloud storage, conferences, or conversations with foreign partners
- temporary access by foreign persons to company servers containing controlled technologies.

Consequently, even equity investment may require a one-time technology transfer permit. The procedure for obtaining an export permit or accreditation applies equally across all three categories of exports.

## TABLE 1. EXPORT PROCEDURE

| Stage | Content | Legal Framework | Timeframe | Involved Authorities | Outcome |
|---|---|---|---|---|---|
| Determination of goods subject to control | The company or the State Service of Export Control of Ukraine (SSECU) determines whether the goods fall under export control. Expertise may be required. | CMU Resolution No. 767 (1997) Law No. 549-IV (2003) | From several days to 2 weeks | SSECU, Interagency Commission on Military-Technical Cooperation Policy | Conclusion on the possibility of export or re-export of goods |
| Preparation | Accreditation of the entity, authorization formalization, preparation of the document package | Law No. 549-IV (2003) CMU Resolution No. 838 (1998) | 1-2 months | SSECU, SSU, SZRU, MFA, Ministry of Economy, MoD | Accreditation, document package |
| Submission to SSECU | Submission of an application for a permit or conclusion with all documents | SSECU Order No. 5 (2004) | Several days | Applicant, SSECU | Application submitted |
| Expert examination | Verification of products, compliance with control lists, end-user analysis, risks, sanctions, embargo | CMU Resolution No. 1807 (2003) Law No. 549-IV CMU Resolution No. 86 (2004) SSECU Order No. 5 (2004) | Up to 45 days (max. 90) – military-purpose goods. Up to 30 days – dual-use goods | SSECU, SSU, MFA, MoD, other central executive authorities, Interagency Commission on Military-Technical Cooperation Policy | Analytical note, expert conclusion |
| Obtaining a permit/conclusion | Issuance of a permit for transfer or a conclusion on the possibility of contract execution | Law No. 549-IV SSECU Order No. 355 (2004) CMU Resolution No. 1807 (2003) CMU Resolution No. 86 (2004) | Not specified | SSECU, Interagency Commission on Military-Technical Cooperation Policy | Certificate of authorization for export/import |
| Customs clearance | Submission of the SSECU permit to customs authorities during export clearance | Customs Code | 1-2 days | State Customs Service, SSECU | Customs declaration with permit |
| Export | Actual cross-border movement of goods | Law No. 549-IV Customs Code | According to schedule | State Border Guard Service, Customs | Physical export of goods |
| Monitoring | Control over compliance with conditions: submission of reports, end-user verification, provision of guarantees | Law No. 549-IV SSECU Instructions | Ongoing | SSECU, MFA, MoD, recipient country | Reporting, guarantee letters |
| Liability | Sanctions, permit revocation, criminal liability | Law No. 549-IV (Art. 20) Criminal Code of Ukraine (Arts. 333, 333-1) CMU Resolution No. 1807 CMU Resolution No. 86 (2004) | Based on inspection results | SSECU, SSU, courts, NSDC | Sanction decision, inspection act, court ruling |

The export control procedure for technology and documentation generally follows the same framework as for military and dual-use goods. However, in this case, there is no stage of physical movement across the state border: the transfer takes place in the form of documents, files, technical information, or knowledge, which can be transmitted electronically.

In addition, a company intending to export technology or knowledge must implement an Internal Compliance Program (ICP) a set of internal policies designed to ensure that employees do not transfer information or technology without proper authorization. While Ukrainian legislation does not explicitly mandate such programs, the absence of an ICP may result in the denial of an export permit.

5. Currency Regulations

During the period of martial law in Ukraine, a number of regulatory restrictions have been introduced. In particular, the NBU Resolution No. 18 of 24.02.2022 *"On the operation of the banking system during the period of martial law"* suspended outgoing transactions from the accounts of residents of the Russian Federation/Belarus, as well as from accounts of legal entities (excluding banks) whose ultimate beneficiaries are residents of these countries. The resolution also imposed restrictions on the transfer of foreign currency abroad.

As part of the 2025 amendments to this resolution, the NBU allowed certain transactions that had previously been prohibited, including dividend repatriation, expansion of operations under the investment limit, conversion of debt into equity, and repayment of loans from non-residents, subject to specific conditions. Banks are also permitted to sell foreign currency from their own positions to fulfill foreign currency obligations (e.g., equipment purchases, loan repayments).

In addition, resident legal entities are allowed to carry out cross-border foreign exchange transactions for specific purposes, provided that the equivalent amount has been transferred since August 7, 2025, to a special NBU account for supporting the Armed Forces of Ukraine. Such transfers must be made exclusively from own funds (not purchased or borrowed foreign currency).

Protection of Ukrainian Military and Dual-Use Technologies in the EU (2025)
In 2025, the protection of Ukrainian defence and dual-use technologies in the EU was strengthened through regulatory mechanisms, import procedures, intellectual property rules, and special cooperation formats. This framework ensures integration into the EU defence ecosystem while maintaining safeguards over sensitive technologies.

1. Regulatory and control mechanisms
- Dual-use technologies from Ukraine are subject to Regulation (EU) 2021/821. Required: classification by CN codes, end-use declaration, supply chain verification. Restrictions are possible even for goods not included in the list (Article 4).
- Military technologies are regulated by the EU Common Military List and the national laws of member states. Permits from national authorities are required, including a security risk assessment.

2. Import verification and security measures
- Importers verify the origin, end user, and compliance with sanctions (EU Sanctions Map).
- Banks apply financial controls (AML/CTF), in particular requesting end-use certificates.
- NDAs, restricted access, and classification rules (Council Decision 2013/488/CFSP) apply to sensitive technologies.

3. Intellectual property
- Ukrainian technologies are protected by patents (European Patent Office), trade secrets (Directive (EU) 2016/943), and copyright.

- Joint development agreements include IP clauses that protect the rights of the parties.

4. Cooperation and integration (update for 2025)

- EU-Ukraine Security Agreement (2024–2025): regulatory harmonization, data protection, joint protocols.
- Protocol between the Ministry of Strategic Industries of Ukraine and ASD (May 2025): ASD Connect online platform with NDA and control requirements.
- BraveTech EU Initiative (July 2025): €100 million to integrate BRAVE1 into EDF/EUDIS, with IP protection built into grant agreements.

6. Legislative Initiatives

1. Draft Law on Screening of Foreign Direct Investment (No. 14062, registered September 22, 2025). This draft law introduces a regulatory framework for screening foreign direct investment in enterprises engaged in the development, production, modernization, repair, transportation, utilization, and trade of military and dual-use goods. It establishes procedures for approval, registration, and monitoring of foreign investments.

Agreements that give a foreign investor significant influence/control will be subject to screening:

- A foreign investor (or related parties) will be entitled to:
  - appoint the sole executive body;
  - form more than 50% of the collegial executive body;
  - elect more than 25% of the members of the supervisory board or other governing body;
  - block decisions of the management bodies.
- A foreign investor (or related parties) acquires property amounting to 10% or more of the book value of the company's assets (according to the latest financial statements).

2. Defence City.

The Law of Ukraine "On Amendments to the Tax Code of Ukraine and Other Laws of Ukraine on Support of Defence Industry Enterprises" introduced a special regime for defence enterprises, including those that produce dual-use goods and components that must meet the established criteria. The Defence City special regime provides for clear exclusion criteria that may be relevant to foreign investors, in particular, legal entities registered abroad are not eligible to participate in the regime (even if they actually operate in Ukraine).

Participation is prohibited if:

- The ownership structure includes citizens/residents of the aggressor state or persons under international sanctions.
- The company has a non-transparent or undisclosed ownership structure, or fails to disclose ultimate beneficial owners.
- Owners or related parties appear on FATF/sanctions/terrorism-related lists.
- The company is controlled by residents of the aggressor state or maintains legal/actual presence in temporarily occupied territories.
- The company has debts to the state, has been declared bankrupt, or is undergoing liquidation.

The law further requires the Cabinet of Ministers of Ukraine to develop a separate simplified procedure for reviewing documents on international transfers of goods conducted within the framework of international agreements of Ukraine. This may pave the way for gradual liberalization of defence exports.

7. Other regulations concerning dual-use goods or defence companies

1. Working with a state customer. To obtain and perform contracts with a state customer during martial law (the Ministry of Defence, other security agencies), an enterprise relies on a number of regulatory acts:

Resolution of the Cabinet of Ministers of Ukraine No. 309 of 17 March 2021 "On Approval of the Procedure for Formation and Adjustment of the Expected Cost of Goods, Works and Services of Defence Purpose Procured by Non-Competitive Procedures" – defines the mechanism for forming and adjusting the expected cost of goods, works and services of defence purpose procured by non-competitive procedures. The cost of defence goods works and services does not include administrative, distribution, advertising expenses, loan interest, penalties, losses from defects, downtime, devaluation of assets, and other indirect costs not directly related to the performance of a state contract. It is worth noting that in Ukraine it is common to separately conclude contracts for the supply of goods and for the provision of services (including training, maintenance, technical support), which differs from international practice, where procurement often covers a comprehensive solution.
Resolution of the Cabinet of Ministers of Ukraine No. 1275 of 11 November 2022 "On Certain Issues of Conducting Defence Procurements for the Period of Martial Law" – establishes a simplified procedure for concluding defence contracts during martial law. Business entities are not allowed to participate in defence procurements if:

- the ultimate beneficial owner, participant or shareholder with a share of 10% or more is the Russian Federation/Republic of Belarus or their citizens (except those legally residing in Ukraine);
- legal entities incorporated and registered under the legislation of the Russian Federation/Republic of Belarus (except in cases of transfer of assets to ARMA management)
- entities that procure goods originating from the Russian Federation/Republic of Belarus.

Resolution of the Cabinet of Ministers of Ukraine No. 233 of 17 March 2021 "On Approval of the Procedure for Creation, Functioning and Maintenance of the Electronic Register of Selection Participants and Contractors of State Contracts (Agreements), and on the Inclusion of Business Entities in It" – the Register is maintained for monitoring information on executed state contracts (agreements), keeping records up to date and ensuring transparency of information on selection participants and contractors of state contracts (agreements), as well as the objectivity of evaluation, selection and re-evaluation of contractors, considering their ability to produce and supply goods, perform works and provide services in accordance with the needs of state customers.

2. Production and storage of explosives, ammunition. Currently, two key temporary regulatory acts govern the production of ammunition and the handling of explosives:

Resolution of the Cabinet of Ministers of Ukraine No. 763 of 21 July 2023 "On Implementation of an Experimental Project Regarding the Production, Procurement and Supply of Ammunition" and

Resolution of the Cabinet of Ministers of Ukraine No. 902 of 16 July 2025 "On Certain Issues of Production, Procurement and Supply of Explosive Substances and Ammunition".

Both documents apply exclusively during martial law. Resolution No. 763 introduces a simplified procedure for launching ammunition production by submitting a declaration, making it possible to avoid complex permitting procedures, but still requires interaction with the Ministry of Defence, the State Labour Service and the Security Service of Ukraine. Resolution No. 902 details documentation procedures: forms of acts, certificates, the procedure for processing products and storing explosives.

In addition, for an enterprise working with explosive materials or producing ammunition, two other documents also apply:

- Order of the Ministry of Internal Affairs of Ukraine No. 622 of 21 August 1998 "On Approval of the Instruction on the Procedure for Manufacture, Purchase, Storage, Accounting, Transportation and Use of Firearms, Pneumatic, Cold and Deactivated Weapons, Devices of Domestic Manufacture for Firing Cartridges Equipped with Rubber or Similar Non-Lethal Projectiles, and of Ammunition, Main Parts of Weapons and Explosive Materials" (regulating the procedure for circulation, storage and control of weapons and ammunition, including conditions for obtaining permits), and
- Order of the Ministry of Energy of Ukraine No. 355 of 12 June 2013 "On Approval of the Safety Rules for Handling Industrial Explosive Materials" (establishing requirements for the safe storage and handling of explosives – from the location of warehouses to protective equipment and surveillance systems).

# CONCLUSION AND POLICY RECOMMENDATIONS

Ukraine's dual-use industry has grown into a diverse ecosystem with different layers of maturity. At its core are several dozen established businesses that already combine innovative products with sustainable business models and reliable track records. These firms have demonstrated the ability to scale and to engage with investors, and they represent an anchor for future industrial growth.

Alongside them is a much larger group of smaller and younger companies, often founded in response to wartime needs. These enterprises are highly dynamic and inventive, but they operate with limited financial reserves and face recurring difficulties in accessing working capital. Their challenges are a signpost of where targeted support is most urgently needed. Much of the problem stems from the specifics of government procurement, where pre-financing is rare and payment cycles are extended, leaving firms with cash-flow gaps despite having confirmed contracts.

1. Work through Ukrainian institutions. Given the sensitivity of dual-use information and significant risks of physical destruction, financing should flow primarily through Ukrainian banks and public programmes that already have experience with defence-related operations. For example, within the "Affordable Credits 5-7-9" programme, only five banks have been authorised to provide loans to defence companies. Even in these cases, the banks receive only limited information about their clients, in contrast to the broader disclosure requirements applied to non-defence businesses. EU support should reinforce these intermediaries with risk-sharing, concessional resources, and capacity-building.
2. Expand financial opportunities to include Ukrainian dual-use. Although many financial institutions do not formally prohibit dual-use activities, in practice they apply a very cautious approach, concentrating support on areas such as cybersecurity or purely civilian IT. For example, several European DFIs define dual-use eligibility only if the military share of a project does not exceed 10%. This rule diverts financing towards primarily commercial projects while excluding more critical initiatives that could directly strengthen European defence and resilience. In the current context of war in Europe, such restrictions are no longer appropriate and should be reconsidered.
3. Expand concessional credit for working capital. The largest bottleneck is liquidity, not long-term financing. Expanding concessional credit facilities—such as through the "5-7-9" programme—would provide immediate relief if structured around government procurement flows. EU support can underwrite these facilities through guarantees and interest-rate subsidies, effectively transforming signed contracts into bankable assets and reducing systemic cash-flow risk across the sector.
4. Maintain grant support for innovation. Grants remain essential for early-stage projects where returns are uncertain but potential impact is high. In 2024, grants continued to represent a significant share of the financing obtained by defence and dual-use companies, remaining one of the primary instruments for supporting early-stage development and innovation. Programmes such as Brave1, USF Dual-Use, and Horizon Europe/EIC Accelerator should continue to provide non-dilutive resources to prototype, test, and validate technologies.
5. Target equity finance strategically. Equity investment is most suitable for the established group of companies that already have governance capacity and growth strategies. For the wider ecosystem, equity is not yet the main pathway; concessional debt and grants are more appropriate instruments.
6. Always integrate risk-mitigation tools. Because the threat of physical destruction or disruption is real, every financing instrument should be paired with risk-transfer mechanisms: political- and war-risk insurance (MIGA, DFC, KUKE), export credit guarantees (UKEF, EGAP, OEKB, Ukrainian ECA), and portfolio guarantees for local banks.

# Appendix 1. METHODOLOGY

The market research was conducted using a combination of quantitative and qualitative analytical methods. The assessment was based on official financial reporting data of enterprises for 2019–2024, as well as open data from state registries, company disclosures, and information provided by the relevant ministry. The analysis included indicators such as revenue, assets, liabilities, number of employees, and legal form.

Market segmentation was carried out according to the primary type of economic activity (CEA) registered by each company. Under Ukrainian legislation, enterprises may register an unlimited number of CEAs, which enables them to operate in diversified areas. However, many companies generate income from multiple activities. Due to the absence of sufficiently detailed data in open sources, it is not possible to precisely allocate revenue across all activities. Therefore, the working assumption is that the dominant share of income is generated from the company's main registered CEA.

The quantitative analysis examined the dynamics of key financial indicators over time, the degree of revenue concentration among groups of different-sized enterprises, and the market structure by ownership type. It also evaluated the distribution of companies by staff size and revenue scale.

The qualitative analysis focused on interpreting the observed changes and trends in sectoral development. In more mature segments, the emphasis was placed on revenue stability, the role of large enterprises, and the presence of competitive conditions. In relatively new segments (e.g., the production of unmanned ground vehicles), the focus was on growth potential, development barriers, and restrictions in international trade.

Market shares were calculated as the ratio of each company's revenue to the total revenue of the respective segment, while growth dynamics were measured as the percentage change between 2024 and 2023. Concentration was assessed based on the combined share of the top-3 and top-5 companies in each segment, and competition was evaluated through the distribution of revenues between large and small/medium producers, as well as their respective growth or decline. Segments with high revenue growth among leaders were interpreted as concentrated, whereas growth in the "other" group indicated the increasing role of small and medium-sized enterprises. Significant fluctuations in revenues were considered in assessing market stability, competitive risks, and potential diversification. This methodology allows for a clear representation of key market trends without attempting a detailed analysis of overly broad segments, where reliable data are not available.

Enterprise classification in Ukraine (according to the Law of Ukraine on Accounting and Financial Reporting, Article 2[46])

- Micro-enterprises – companies that meet at least two of the following criteria (based on the previous year's annual financial statements):
    - assets up to €350,000;
    - net revenue up to €700,000;
    - average staff up to 10 employees.
- Small enterprises – not qualifying as micro, but meeting at least two of:
    - assets up to €4 million;
    - net revenue up to €8 million;
    - staff up to 50 employees.
- Medium enterprises – not qualifying as small, but meeting at least two of:

[46] See Law of Ukraine "On Accounting and Financial Reporting in Ukraine"

    - assets up to €20 million;
    - net revenue up to €40 million;
    - staff up to 250 employees.

- Large enterprises – exceeding the medium thresholds, i.e. at least two of:
    - assets over €20 million;
    - net revenue over €40 million;
    - staff over 250 employees.