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TRANSFORMATION OF FUNDING MECHANISMS FOR UKRAINIAN STARTUPS: ANALYSIS OF STAGE GAPS AND THE “VALLEY OF DEATH” PHENOMENON IN WARTIME CONDITIONS

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The article is devoted to the study of transformation of funding mechanisms for Ukrainian startups under full-scale war conditions with focus on analysis of stage gaps and the “valley of death” phenomenon. The relevance is determined by critical changes in the venture financing structure that threaten the survival of an entire generation of innovative companies and undermine the long-term competitiveness of the Ukrainian ecosystem. The aim is to identify and systematise gaps in startup financing at different development stages, analyse the transformation of the classical “valley of death” under wartime conditions, and develop recommendations for overcoming the identified dysfunctions. The research is based on empirical analysis of venture financing data using official ecosystem reports. The key result is the identification of the “valley of death” inversion phenomenon: despite record financing at the earliest stages, capital for subsequent rounds demonstrates critical reduction, creating a situation where successful seed startups cannot obtain financing for scaling. Extreme asymmetry of war impact was revealed: early stages recovered due to grants and local funds, whilst middle and late stages remain at critically low levels due to the outflow of international venture funds. The limited compensatory role of grants was proved, which do not replace equity financing due to the absence of mentorship, access to investor networks, and capital structure formation. A critical threat to the ecosystem pipeline was established: seed startups will not be able to obtain subsequent rounds under the current financing structure. The practical significance lies in identifying critical intervention points and substantiating the necessity of systemic changes in startup support mechanisms. Based on the conducted analysis, proposals were formulated regarding the attraction of international capital, transformation of grant financing, and ensuring financing continuity. The originality lies in the first systematic analysis of stage-specific war impact on venture financing and conceptualisation of the “valley of death” inversion phenomenon.

Keywords: financing mechanisms, startups, life cycle stages, valley of death, venture capital, Ukrainian startup ecosystem, war impact.

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Problem statement

The Ukrainian startup ecosystem demonstrates a unique development trajectory that combines significant potential for technological innovation with extreme challenges caused by full-scale war. The invasion on 24 February 2022 caused the biggest shock in the history of the Ukrainian startup industry: the volume of investments fell by 72% – from \$832 million USD (2021) to \$236 million (2022) [1-4]. However, by 2024, financing increased by 121% to \$462 million, reaching 55% of the historical peak

[1-4]. This is the fastest recovery amongst countries that experienced military conflicts, however, the financing structure underwent dramatic transformations, which led to the deepening of the "valley of death" phenomenon and the emergence of critical stage gaps.

The relevance of researching startup financing mechanisms at different life cycle stages is determined by several key factors. Ukraine's empirical experience is unique for understanding the resilience of innovative entrepreneurship under extreme conditions. The identified structural problems – collapse of angel financing, excessive dependence on grants, and absence of late-stage capital – are typical for developing ecosystems and require systemic solutions. The accumulated data allow for formulating practical recommendations for state policy supporting startups under crisis conditions.

Particular attention is drawn to the «valley of death» phenomenon – a critical gap in financing between early stages (Seed) and scaling stages (Series A, B). In 2024, an unprecedented inversion is observed: despite record Seed ($88 million), Series A financing fell to $58 million, which constitutes only 37% of the 2021 peak [1-4]. This creates a risk of losing an entire generation of startups that will not be able to obtain the next funding round.

Analysis of recent research and publications

Research on startup financing mechanisms and the «valley of death» problem has gained significant relevance in the context of transformation of the Ukrainian innovation ecosystem under the influence of war.

Fundamental theoretical foundations of stage-based startup development were laid in the work by Salamzadeh A. and Kawamorita Kesim H. [5], who systematised the startup life cycle from idea to exit, identifying three critical transition points: bootstrap-to-seed (initial capital problem), seed-to-growth (Valley of Death), and growth-to-exit (scaling for M&A/IPO). The authors emphasise that each stage is characterised by a unique profile of risks, financial needs, and investor expectations, which requires a differentiated approach to financing mechanisms.

Theoretical foundations of stage-based startup financing are considered in works by foreign researchers. Mittelmeijer H. G. et al. [6] in a study of the European deep tech (science-intensive technologies) sector identified three key obstacles of the "valley of death": limited financing after Series A (limited exits, lower valuations), regulatory fragmentation (licensing procedures up to 5 years), and absence of corporate partners for commercialisation. The authors emphasise the critical role of the tripartite alliance model amongst startups, corporations, and investors for overcoming the gap between R&D and scaling.

Zapata-Molina C. et al. [7] based on structural modelling (SEM) identified four critical factors of startup financial sustainability during passage through the "valley of death": solvency (в=0.938), liquidity (в=0.782), profitability (в=0.625), and asset efficiency (в=0.596). The research confirms that financial discipline has greater significance for survival than product innovativeness.

Helman L. [8] in a fundamental study of the "valley of death" phenomenon identifies three critical types of gaps in innovation financing: technological gap (between fundamental research and prototype), commercialisation gap (between prototype and market product), and scaling gap (between first sales and scaling). The author proves that traditional venture financing mechanisms are ineffective for overcoming the first two types of gaps due to excessive risk and long payback period, which necessitates hybrid models combining grants, corporate venture capital, and state support.

The Ukrainian context of stage-based financing was researched by a number of domestic scholars. Puzhko S. H. [9] considers the «valley of death» as a strategic gap between initial financing and reaching break-even point, when a startup exhausts seed capital but does not yet generate sufficient revenue. The author identifies six critical signs of entering the "valley of death": negative cash flow, absence of product-market fit, loss of key team members, ineffective business model, underestimation of time to profitability, and absence of reserve capital.

Bondarchuk N. V. [10] systematises characteristics of startup life cycle stages in the Ukrainian context, identifying the evolution of risks from technical (Pre-seed) to market (Seed) and operational (Series A). The research shows a decrease in investors' expected profitability from 50-100x at Pre-seed to 2-3x at the Expansion stage, which reflects the change in the risk-return profile.

The specifics of the Ukrainian startup ecosystem during war were analysed by Lytvyn I. V. and Bulak Yu. V. [11], who identified critical challenges of 2022: financial deficit (99% of companies needed support), operational disruptions, outflow of foreign capital, and forced relocation. At the same time, the authors emphasise the resilience of the Ukrainian industry and ability to adapt, particularly through focusing on high-tech sectors.

The role of support infrastructure was researched by Dyba M. V. [12], who analyses the functions of incubators and accelerators at different development stages. The author identifies a critical distinction: incubators work with ideas (TRL 1-4) and provide free infrastructure without equity stake, whilst accelerators invest 10-50 thousand euros for 3-8% equity stake in seed startups with MVP and provide structured mentorship for preparation for Series A.

Mechanisms of angel financing at early stages are analysed in detail by Maxwell A. L. et al. [13], who based on empirical research identified three sequential phases of business angel decision-making: preliminary selection (rejection of 90% of projects within 10 minutes based on entrepreneur quality and market potential), detailed verification (in-depth analysis of team, product, and financial projections), and negotiations (deal structuring with focus on corporate governance rights). The research proves that at Pre-seed and Seed stages, team quality has greater significance than financial metrics, which explains the critical role of angel investors in overcoming the initial financing gap.

Borshch V. I. and Krusir T. O. [14] researched the role of business angels in the development of innovative entrepreneurship in Ukraine, identifying project selection criteria: entrepreneur's personality, market growth potential, and competitive advantages of the idea. The authors emphasise the role of the UAngel association as a platform for syndication of angel investments and reduction of individual risks.

Despite a significant number of studies, the question of transformation of financing mechanisms at different life cycle stages of startups under wartime conditions remains insufficiently studied, particularly the problem of «valley of death» shift from early stages (Seed → Series A) to middle stages (Series A→ Series B) and the phenomenon of the compensatory role of grants in the absence of angel capital.

The aim of the article

The aim of the article is to analyse the transformation of funding mechanisms for Ukrainian startups at different life cycle stages during the period 2020-2024, study the «valley of death» phenomenon, and identify structural imbalances and critical stage gaps in financing that hinder the scaling of innovative entrepreneurship under wartime conditions.

To achieve the stated aim, the following tasks are addressed: to systematise theoretical foundations of startup financing mechanisms by life cycle stages; to analyse the dynamics and structure of Ukrainian startup financing in 2020-2024 by investor types and development stages; to identify characteristics and causes of «valley of death» formation in the Ukrainian ecosystem; to research compensatory mechanisms (grants, relocation) and their effectiveness in overcoming stage gaps; to formulate practical recommendations for state policy supporting startups under wartime conditions.

Presentation of main research material

Investor requirements at different life cycle stages. Startup financing mechanisms are characterised by substantial differentiation of investor requirements depending on the company's development stage (Table 1). The evolution of requirements reflects the decrease in risk level and change in priorities from technical implementation of the idea to achieving market leadership.

At the Pre-seed stage, investors concentrate on concept validation and creation of a minimum viable product (MVP). The typical financing volume is $50-500 thousand, the main sources are business angels, friends & family, and grants [1-4]. The key metric is achieving problem-solution fit – confirmation that the proposed solution corresponds to a real market problem. In the Ukrainian context, median Pre-seed financing is $150 thousand, which is substantially lower than European indicators.

The Seed stage is characterised by the transition from MVP to confirmation of product-market fit. Expected revenue grows to $0-500 thousand annual recurring revenue (ARR), typical financing is $500 thousand - $2 million [1-4]. Investors at this stage focus on the appearance of first paying customers and confirmation of sales repeatability. In Ukraine, median Seed financing is $350 thousand, which reflects the limited purchasing power of the local market and the necessity of early entry into international markets.

Series A is a critical transition from concept validation to business scaling. Investors at this stage require confirmation of unit economics: the ratio of customer acquisition cost (CAC) to lifetime value (LTV) must exceed 1:3 [6]. Typical financing grows to $2-15 million, and the main investors become regional-level venture funds. In the Ukrainian context, the median Series A size is only $3 million compared to $5-7 million in Central and Eastern Europe, which creates a problem of underfunding for rapid scaling.

Series B and Series C+ stages are characterised by focus on growth efficiency and path to profitability. Investors apply the Rule of 40 (revenue growth rate + profitability must exceed 40%) and expect multiple revenue channels [7]. A critical problem of the Ukrainian ecosystem is the almost complete absence of late-stage capital: median Series C+ financing in Ukraine is $50 million, however, the overwhelming majority of these funds are concentrated in 1-2 mega-deals per year.

Characteristics of startup life cycle stages. Startup life cycle stages are characterised by the evolution of risk types, capital needs, and financing sources (Table 2). Understanding these characteristics is critical for effective management of innovative enterprise financial resources.

The Pre-seed stage focuses on idea validation and MVP development. The main risk is technical risk – whether the product works at all. Capital needs are minimal ($1-200 thousand), main expenses are

Table 1

Typical Investor Requirements by Stages

Parameter	Pre-seed	Seed	Series A	Series B	Series C+
Stage Definition	Idea → MVP	MVP → PMF	PMF → Scaling	Scaling → Expansion	Pre-IPO/M&A
Typical Financing	$50-500K	$500K – $2M	$2-15M	$10-40M	$40+ M
Expected Revenue	Pre-revenue	$0 – $500K ARR	$500K – $3M ARR	$3M – $10M ARR	$10M+ ARR
Metrics for Validation	Problem-solution fit	Product-market fit	Unit economics (CAC/LTV)	Growth efficiency (Rule of 40)	Path to profitability
Main Investors	Angels, family/friends, grants	Angels, micro-VC	VC (local + regional)	VC (regional + global tier-2)	Growth equity, PE, tier-1 VC
Key Milestone	Working prototype	First paying customers	Repeatable sales model	Multi-channel revenue	Market leadership
Team Size	2-5	5-15	15-50	50-150	150+
Typical Median in Ukraine	$150K	$350K	$3M	$7M	$50M

Source: compiled by the author based on generalisation [5; 6; 10; 1-4]

Table 2

Comparative Characteristics of Startup Life Cycle Stages

Stage	Characteristics	Key Risks	Typical Capital Needs	Main Financing Sources	Expected Investor Return
Pre-seed	Idea validation, MVP development, first tests	Technical risk (does the product work?), team risk	$1-200K	3F (family, friends, "fools"), micro-grants, business angels	50x-100x
Seed	Concept confirmation, business model testing, first customers	Market risk (is the product needed?), product-market fit	$0.5-1M	Business angels, seed VC, crowdfunding, grants	10x-50x
Start-up (Series A)	PMF confirmation, scaling, team formation	Operational risk (can we scale?), unit economics	$5-10M	Venture funds (VC), corporate VC	5x-10x
Early Growth (Series B)	Active growth, entry into new markets, diversification	Competitive risk (will we maintain positions?), cash flow management	$10-50M	VC, Private Equity, strategic investors	3x-5x
Expansion (Series C+)	Global scaling, mergers and acquisitions, exit preparation	Execution risk (will we achieve critical mass?), regulatory risks	$50+ M	Growth Equity, PE, corporate investors	2x-3x
Exit (IPO/M&A)	Going public or sale, liquidity for investors	Market risk (valuation), exit timing risk	N/A (exit event)	Public markets, corporations	Profit realisation

Source: compiled by the author based on [1-4; 6; 9; 10]

Transformation of funding mechanisms for Ukrainian startups: analysis of stage gaps and the “valley of death” phenomenon in wartime conditions

related to development and first tests [10]. Financing sources are 3F (family, friends, «fools»), micro-grants, and business angels. Expected investor profitability at this stage reaches 50-100x due to extremely high failure risk.

The Seed stage is characterised by transition from technical to market risk – whether the product is needed by the market. Product-market fit confirmation becomes the main priority, which requires attracting first customers and testing the business model. Capital needs grow to \$0.5-1 million, the main sources become business angels, seed VC funds, crowdfunding, and grants [9]. Expected profitability decreases to 10-50x, which reflects the reduction of technical risk whilst maintaining high market uncertainty.

The Start-up (Series A) stage marks the transition to scaling of a validated business model. Operational risk becomes dominant – whether the company is capable of scaling efficiently. Achieving positive unit economics is critical, when customer acquisition cost pays back within an acceptable period [6]. Capital needs grow to \$5-10 million, the main investors become venture and corporate VC funds. Expected profitability decreases to 5-10x, reflecting risk reduction whilst maintaining significant growth potential.

Early Growth (Series B) is characterised by active growth and entry into new markets. Competitive risk becomes dominant – whether the company can maintain positions against the threat of business model copying. Cash flow management acquires critical importance due to the growth of operational expenses [7]. Capital needs reach \$10-50 million, strategic investors appear. Expected profitability decreases to 3-5x.

The Expansion (Series C+) stage focuses on global scaling and exit preparation. Execution risk – whether the company will achieve critical mass for successful IPO or M&A – becomes key. Regulatory risks related to international expansion appear. Capital needs exceed \$50 million, investors are growth equity and PE funds [1-4]. Expected profitability decreases to 2-3x, which is compensated by substantially lower risk.

Support infrastructure by development stages. Startup support infrastructure is differentiated by development stages and performs different functions depending on company needs (Table 3). Understanding the role of each infrastructure type is critical for effective use of available resources.

Incubators work with startups at the Pre-seed stage, when the company only has an idea or prototype. Incubation programmes are characterised by indefinite or long-term stay (up to 2-3 years), free premises rental and utility services without equity stake requirement [12]. The main value of incubators is access to workspace, basic infrastructure (internet, accounting equipment), and mentor network for novice founders. However, incubators do not provide direct financing and do not participate in company equity.

Accelerators focus on Seed and Start-up stages, working with startups that have MVP and first customers. Acceleration programmes are intensive (3-6 months), include direct investment of 10-50 thousand euros for 3-8% equity stake and structured mentorship with focus on specific growth metrics [12]. The key distinction of accelerators is their status as equity investors with clear focus on preparing startups for Series A. The programme concludes with a demo day for institutional investors.

Table 3

Comparative Characteristics of Support Infrastructure by Development Stages

Parameter	Incubators	Accelerators	Technology Parks	Technopolises
Target Stage	Pre-seed	Seed, Start-up	Early Growth, Expansion	Expansion, Exit
Programme Duration	Indefinite (up to 2-3 years)	3-6 months	Long-term (5+ years)	Long-term (10+ years)
Financing	Free rental, utilities	€10-50K for 3-8% equity	Preferential rental, tax benefits	Comprehensive infrastructure
Mentorship	Basic (mentor network)	Intensive (focus on growth)	Industry consultants	R&D institutes, universities
Key Focus	Transition idea → MVP	Preparation for Series A	Production scaling	Global competitiveness
Typical Team Size	2-5 people	5-15 people	50-200 people	200+ people
Examples in Ukraine	Unit.City Incubator, iHUB	Startup Wise Guys Kyiv, GrowthUP	Diia.City (virtual)	Absent

Source: compiled by the author based on [1-4; 12]

Technology parks and technopolises are oriented towards late-stage startups (Early Growth, Expansion), which require production scaling and integration into global value chains. Technology parks provide preferential rental of production facilities, tax benefits, and access to industry consultants [10]. Technopolises form a comprehensive ecosystem with R&D institutes, universities, and corporate partners to ensure global competitiveness.

A critical problem of the Ukrainian ecosystem is the absence of technopolises and limited number of active technology parks. Diia.City functions as a virtual technology park, providing tax benefits (5% single tax, 1.5% military levy), however, it does not provide physical infrastructure and R&D cooperation [1-4]. Startup Wise Guys (office in Kyiv since 2020) is the most active international accelerator, which conducted 4 cohorts with 40+ Ukrainian startups, providing access to 10-25 thousand euros initial investment and connections with the investor network of Central and Eastern Europe.

Factors of startup financial sustainability during the "Valley of Death". Passage through the "valley of death" – a critical period between exhaustion of initial financing and achievement of operational self-sufficiency – requires focusing on key factors of financial sustainability.

Zapata-Molina et al. [7] based on structural modelling identified four critical factors that determine startup survival during passage through the «valley of death» (Table 4). Solvency with coefficient β =0.938 is the most significant factor, reflecting the company's ability to cover long-term obligations and maintain operational activity without bankruptcy threat. The critical indicator is the debt-to-equity ratio, which should not exceed 2:1 for seed startups.

Liquidity (β=0.782) reflects the company's ability to generate sufficient cash flow to cover current expenses. The key metric is cash reserve – the number of months during which the company can function at the current burn rate without additional financing [9]. For safe passage through the «valley of death,» the cash reserve must be at least 12-18 months.

Profitability (β=0.625) reflects the company's ability to generate positive results from core operations. For SaaS startups, the critical metric is gross margin, which must exceed 60% to ensure the possibility of reinvestment in growth [6]. What is important is not so much achieving net profit at early stages, but rather demonstrating the path to unit economics break-even – the point when revenue from one customer exceeds the costs of their acquisition and service.

Asset efficiency (β=0.596) characterises the productive use of available resources to generate revenue. The key metric is asset turnover ratio – the ratio of revenue to asset value, which must demonstrate an increasing trend.

The critical conclusion of the Zapata-Molina et al. [7] study is that financial discipline has higher significance for survival than product innovativeness. Negative cash flow is the main cause of startup failure during the «valley of death,» which emphasises the importance of controlling burn rate and planning runway.

Dynamics of Ukrainian startup financing by stages (2020-2024). The period 2020-2024 is characterised by extreme volatility of Ukrainian startup ecosystem financing, caused by the COVID-19 pandemic and full-scale war. Analysis of dynamics by stages allows for identifying structural transformations and critical financing gaps (Table 5).

The total volume of venture financing demonstrates a dramatic trajectory: growth from \$302 million (2020) to a peak of \$534 million (2021), collapse to \$186 million (2022), and recovery to \$462 million (2024) [1-4]. However, this overall dynamics masks substantial disproportions amongst stages, which create a new type of «valley of death» phenomenon.

Analysis of the stage-based war impact reveals asymmetric impact on different financing stages. Seed

Table 4

Factors of Startup Financial Sustainability During the "Valley of Death"

Factor	Coefficient β	Significance	Description
Solvency	0.938	p=0.01	Ability to cover long-term obligations and maintain operational activity. Debt-to-equity ratio < 2:1
Liquidity	0.782	p=0.01	Ability to generate sufficient cash flow to cover current expenses. Cash reserve ≥ 12-18 months
Profitability	0.625	p=0.01	Ability to generate positive results from core operations. Gross margin ≥ 60% for SaaS
Asset Efficiency	0.596	p=0.01	Productive use of resources to generate revenue. Optimisation of asset turnover (ROA)

Source: compiled by the author based on [7] financing demonstrates unique resilience: $88 million in 2024 exceeds the peak indicator of 2021 ($84 million) by 5%, which is a record level in the ecosystem’s entire history [1-4]. This is explained by three factors: firstly, activation of grant programmes (Ukrainian Startup Fund, Brave1, EU4Ukraine), which compensate for the absence of business angels; secondly, preservation of local seed VC fund activity (AVentures, SMRK, u.ventures), which demonstrate patriotic motivation; thirdly, the emergence of Defense Tech as a new high-demand sector. However, the compensatory role of grants is limited, as Maxwell et al. [13] prove that at Pre-seed and Seed stages, angel investors assess team quality and provide critical access to mentorship and networks, which non-refundable grants cannot replace.

In contrast, Series A and Series B experienced critical collapse (see Figure 1). Series A financing in 2024 is only $58 million, which is 37% of the 2021 peak ($158 million) – a drop of 63% [1-4]. Series B shows similar dynamics: $43 million in 2024 is 35% of the peak of $124 million (2021) – a drop of 65%. This creates an unprecedented situation of “valley of death” inversion: if in 2021 natural growth was observed Seed ($84 million) → Series A ($158 million) with multiplier ×1.9, then in 2024 an inversion occurs Seed ($88 million) → Series A ($58 million) with multiplier ×0.66.

The causes of Series A/B financing collapse are: firstly, outflow of international tier-2 level VC funds that traditionally invested in Series A (Tiger Global, Partech, Earlybird are no longer active in Ukraine); secondly, substantial increase in due diligence requirements and risk premium for Ukrainian origin; thirdly, limited capabilities of local funds that do not have sufficient fund size for serious Series A rounds ($5-10 million).

Series C+ demonstrates paradoxical growth: $223 million in 2024 exceeds the 2021 peak ($160 million) by 39% [1-4]. However, this indicator is misleading: 90% of Series C+ financing in 2024 is one mega-deal Creatio ($200 million from Sapphire Ventures). Excluding Creatio, Series C+ is only $23 million (5% of total volume), which is 86% lower than 2021. This confirms the fundamental problem of absence of late-stage capital for scaling successful startups to global companies.

Table 5

Comparative dynamics of financing by stages (2020-2024)

Stage	2020 ($M)	2021 ($M)	2022 ($M)	2023 ($M)	2024 ($M)	CAGR 2020-2024	War Impact (2024 vs 2021)
Seed	42	84	22	52	88	+20.3%	+5% (positive dynamics)
Series A	119	158	45	27	58	-16.5%	-63% (critical problem)
Series B	45	124	28	20	43	-1.1%	-65% (critical problem)
Series C+	91	160	79	103	223	+25.1%	+39% (positive dynamics)
Grants	5	8	12	7	50	+78.1%	+525% (new category)
TOTAL	302	534	186	209	462	+11.2%	-13%

Source: compiled by the author based on [1-4]

Note: Data for 2020-2023 may differ from previous reports due to retroactive adjustments and refinement of calculation methodology.

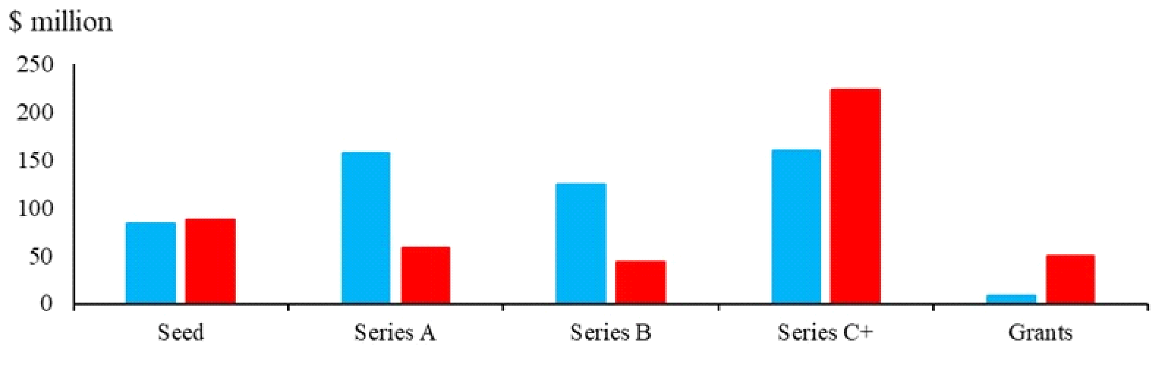

Fig. 1. Comparison of Financing by Stages: 2021 (peak) vs 2024 (war)

Source: compiled by the author based on [2; 4]

Grants emerged as a new compensatory category: growth from $8 million (2021) to $50 million (2024) is 525%, which reflects the scale of the problem with traditional equity financing [1-4]. The main sources of grants are Brave1 (40+ million dollars for ~1,000 Defense Tech startups), Ukrainian Startup Fund (380+ projects at $25-50 thousand), and Google Ukraine Support Fund (82 projects at $100 thousand). However, grants do not replace equity financing: they do not provide mentorship, access to investor networks, corporate governance support, and do not create a capitalisation table for subsequent rounds.

Analysis of compound annual growth rate (CAGR) for the period 2020-2024 reveals long-term trends. The fastest growth is shown by grants (+78.1% CAGR) – a compensatory mechanism caused by war. Series C+ demonstrates +25.0% CAGR, however, this indicator is determined exclusively by the Creatio outlier. Seed demonstrates stable +20.3% CAGR, which is the only stage that has fully recovered to pre-war levels. In contrast, Series A (-16.5% CAGR) and Series B (-1.1% CAGR) show prolonged decline, which creates a critical problem for the startup pipeline of subsequent years.

The temporal dynamics of war demonstrates three transformation phases: 2022 (shock) – a drop of 65% compared to the previous year, when all stages suffered equally; 2023 (bottom) – stabilisation at a low level with minimal drop of 11% compared to the previous year; 2024 (selective recovery) – growth of 121% compared to the previous year, however, with extreme asymmetry amongst stages, when Seed and Series C+ recovered, whilst Series A/B remain at a historical bottom.

The “Valley of Death” in the Ukrainian startup ecosystem. The “valley of death” phenomenon in the Ukrainian startup ecosystem acquired specific characteristics under the influence of war, shifting from the traditional Seed → Series A gap to middle stages Series A → Series B and creating new forms of financial gaps.

The classical concept of the “valley of death,” described by Puzhko [9] and Mittelmeijer et al. [6], defines it as a critical period between exhaustion of initial capital and achievement of operational self-sufficiency, when a startup has negative cash flow but does not yet generate sufficient revenue to cover expenses. Helman [8] differentiates three types of gaps in innovation financing: technological gap, commercialisation gap, and scaling gap, emphasising the ineffectiveness of traditional venture capital for overcoming the first two due to excessive risk. Under Ukraine 2024 conditions, the «valley of death» transformed into the «missing middle» phenomenon – a critical gap between successful Seed financing and practically inaccessible Series A/B capital, which corresponds to the combination of commercialisation gap and scaling gap (Table 6).

The Seed → Series A inversion with multiplier r0.66 is unprecedented for any startup ecosystem in peacetime. This means that despite record Seed ($88 million), next stage financing decreases to $58 million, creating a situation where successful seed startups cannot obtain Series A for scaling [1-4]. The norm for mature ecosystems assumes financing growth with multiplier ×1.5-3 at each subsequent stage, which reflects the natural survival filter and growth of average round size.

Table 6

Characteristics of the “Valley of Death” in Ukraine (2024)

Parameter	Seed → Series A	Series A → Series B	Series B → Series C+
Initial Stage Financing ($M)	$88	$58	$43
Next Stage Financing ($M)	$58	$43	$223
Growth Multiplier	×0.66 (critical inversion)	×0.74 (continued decline)	×5.2 (excessive jump)
Norm for Mature Ecosystems	×1.5-3 (growth)	×1.5-2 (growth)	×1.5-2 (growth)
Typical Transition Time	18-24 months	18-24 months	24-36 months
Main Failure Causes	Absence of PMF, cash reserve exhaustion, weak team	Inability to scale, negative unit economics, competition	Market saturation, operational problems, cash flow management
Compensatory Mechanisms in Ukraine	Grants ($50M in 2024), relocation to EU for Series A access	Bridge rounds from local VC, corporate partnerships	Absent – only isolated mega-deals

Source: compiled by the author based on [1-10]

Continued decline Series A → Series B with multiplier ×0.74 creates a second "valley of death" for companies that successfully passed Series A (see Figure 2). Startups that raised $58 million at stage A face even greater difficulty raising Series B ($43 million total in the market) [1-4]. This means that even with successful scaling and unit economics validation, companies cannot obtain capital for international expansion and product line diversification.

The excessive jump Series B → Series C+ with multiplier ×5.2 is the result of the Creatio effect: one mega-deal of $200 million creates a misleading impression of late-stage capital availability [1-4]. Excluding Creatio, the real multiplier is only ×0.53, which confirms the systemic problem of absence of growth equity for scaled companies.

Compensatory mechanisms that emerged in the Ukrainian ecosystem include large-scale grant financing ($50 million in 2024), however, it does not replace equity financing due to limited sizes ($25-50 thousand vs $500 thousand+ for seed financing), absence of smart capital – mentorship and access to investor networks, and non-creation of capital structure for subsequent rounds [15]. The particular criticality of angel capital loss is explained by the fact that at early stages angels apply qualitative selection criteria (team, market potential) and provide corporate governance support [13; 14], which fundamentally differs from the logic of grant programmes. The alternative becomes forced relocation to the EU for Series A access, which leads to loss of Ukrainian roots and tax revenues.

The critical consequence of the new type of "valley of death" is the pipeline problem: seed startups of 2022-2024 (cumulatively ~450 companies that raised $162 million) will not be able to obtain Series A in 2025-2026 under the current financing structure. This means the loss of an entire generation of potential unicorns that could have emerged by 2032-2034 under normal development trajectory.

Trajectories of Ukrainian unicorns: stage nalysis. Analysis of trajectories of Ukrainian unicorns – companies with valuation over $1 billion – allows for identifying typical paths to success and war impact on late-stage financing (Table 7).

As of 2024, the Ukrainian ecosystem has 6 unicorns with Ukrainian founders: Grammarly (>$13 billion, decacorn), GitLab (>$10.4 billion, public company), BITFURY (>$2 billion), airSlate ($1.25 billion), Creatio ($1.2 billion, new unicorn 2024), People.ai ($1.1 billion) [1-4]. This is a significant achievement for a developing ecosystem, demonstrating the ability to generate global technology leaders even under wartime conditions.

Analysis of dynamics by years reveals the war's impact on late-stage development. Before the war (2018-2021), the Ukrainian ecosystem generated on average 1.0 unicorn per year: 2018 (2 companies), 2019 (1), 2021 (1 + GitLab IPO at $15 billion) [1-4]. During the war (2022-2024), the pace slowed to 0.67 unicorn per year: 2022 (1), 2023 (0 – the first year without new unicorns since 2020), 2024 (1). This represents a 33% decrease, which is significant, however, not a critical indicator considering extreme conditions.

Stages of achieving unicorn status demonstrate diversification of approaches: 3 companies achieved through Series D+ (GitLab, People.ai, BITFURY), 2 companies through growth/secondary rounds (airSlate, BITFURY), 2 companies through Series C

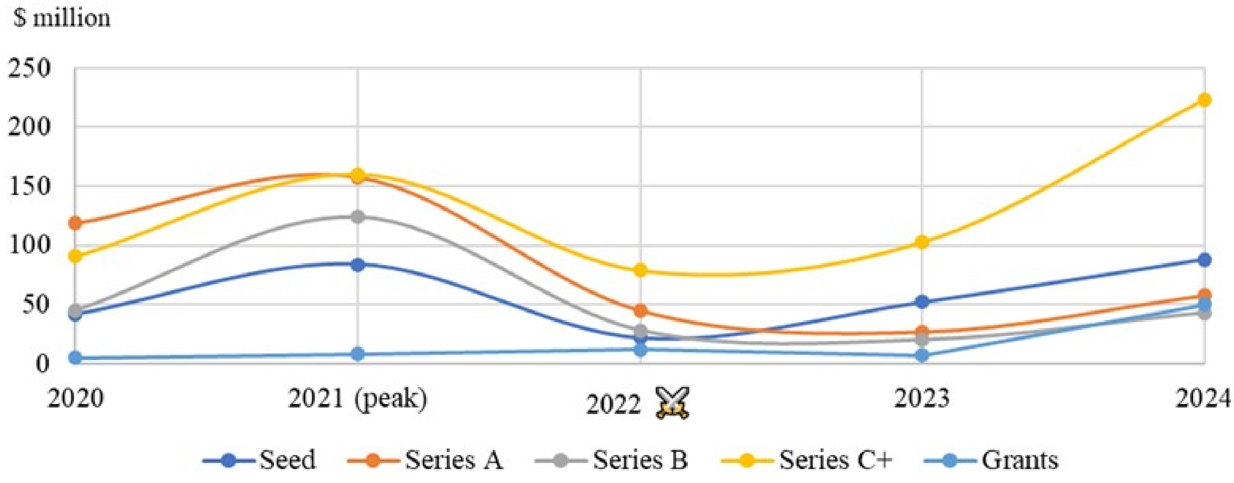

Fig. 2. Visualisation of the "Valley of Death" in the Ukrainian Startup Ecosystem

Source: compiled by the author based on [1-10]

(Grammarly, Creatio). The average achievement stage is late-stage rounds with volume 100+ million dollars, which emphasises the critical importance of late-stage capital availability.

Time to unicorn varies from 5 to 10 years, which reflects different development strategies. The fastest path was demonstrated by People.ai (5 years) due to AI/ML advantage and high-tempo B2B SaaS model. The average time is 7-8 years, which is typical for B2B SaaS companies with sustainable growth. The longest path at Grammarly and Creatio (10 years) is explained by the strategy of first self-financing, then raising venture capital – companies first achieved profitability, then raised venture capital for aggressive scaling.

Paths to unicorn status reveal three main trajectories. Early venture capital support (GitLab, People.ai) is characterised by a fast path (5-6 years) through sequential passage of Series A → B → C → D with growing rounds. Self-financing with later venture capital raising (Grammarly, Creatio) is slower (10 years), however, ensures profitable unit economics and founder control. Hybrid approach (airSlate, BITFURY) combines self-financing at early stages with strategic rounds at late stages.

Resilience to war at late stages is confirmed by two cases. In 2022, airSlate achieved a valuation of $1.25 billion despite full-scale war, raising a growth round of $425 million from Morgan Stanley and Horizon Capital [1-4]. In 2024, Creatio became a new unicorn with a valuation of $1.2 billion, raising Series C of $200 million from leading venture fund Sapphire Ventures [1-4]. This proves that validated companies with international revenues and profitable unit economics remain attractive to global investors even during war.

The critical conclusion of stage analysis is that the Ukrainian ecosystem maintains the ability to generate unicorns even under wartime conditions. However, the pace slowed by 33%, and the absence of new unicorns in 2023 signals a disruption in the pipeline of companies that passed Series A/B in 2020-2021 and were to achieve unicorn status in 2023-2025. The greatest threat is that the new seed pipeline (2022-2024, $162 million in ~450 companies) may not produce any unicorns by 2032-2034 due to the absence of Series A/B capital for scaling.

Sectoral transformations of the ecosystem. Separately, it is worth noting the emergence of Defense Tech as a new driver of the Ukrainian startup ecosystem. The volume of investments in Defense Tech grew from $12 million (2022) to $59 million (2024), which constitutes 13% of total venture financing [1-4]. The compound annual growth rate (CAGR) for the period 2022-2024 is +122%, which is the fastest growth amongst all sectors.

The financing structure of Defense Tech is characterised by the dominance of grants: 69%

Table 7

Dynamics of Ukrainian Unicorn Emergence (2018-2024): Stage Analysis

Year	Company	Valuation	Achievement Stage	Key Rounds (path to unicorn)	Time to Unicorn	Period
2018	GitLab	$1.1B → $6B (2020)	Series D	Seed → A ($1.5M, 2012) → B ($4M, 2013) ? C ($20M, 2015) → D ($20M, 2016) → E ($1.1B, 2018)	6 years	pre-war
2018	BITFURY	$2B+	Growth	Early funding → Series A+B ($80M, 2015-2017) → Valuation $2B (2018)	7+ years	pre-war
2019	Grammarly	$1B → $13B (2021)	Series C	Bootstrap (2009-2017) → Series A ($90M, 2019, $1B) → Series B ($200M, 2021, $13B)	10 years	pre-war
2021	People.ai	$1.1B	Series D	Series A → B → C → D ($107M, 2021, $1.1B)	5 years	pre-war
2022	airSlate	$1.25B	Growth	Series A+B ($51.5M) → Growth ($425M, 2022, $1.25B) from Morgan Stanley + Horizon	8 years	1st year of war
2024	Creatio	$1.2B	Series C	Bootstrap (2014-2019) → Series A ($68M, 2020) → Series C ($200M, 2024, $1.2B)	10 years	3rd year of war

Source: compiled by the author based on [1-4]

($41 million) comes through non-refundable financing from Brave1, Ukrainian Startup Fund, Google Ukraine Support Fund, and NATO Innovation Fund programmes, whilst equity investments constitute 31% ($18 million) [1-4]. The main equity investors are specialised Defense Tech funds (D3 VC, MITS Capital, Green Flamingo) and United Angels Network, which focuses exclusively on military technologies.

Conclusions

The study of funding mechanisms for Ukrainian startups at different life cycle stages during the period 2020-2024 revealed critical structural transformations caused by full-scale war and specific forms of the "valley of death" that threaten the long-term development of the innovation ecosystem.

The key conclusion is the identification of the "valley of death" inversion phenomenon: despite record Seed ($88 million in 2024), Series A financing is only $58 million (multiplier ×0.66 instead of norm ×1.5-3 for mature ecosystems). This creates an unprecedented situation where ~450 seed startups of 2022-2024 will not be able to obtain the next funding round, which threatens the loss of an entire generation of potential unicorns.

The stage-based war impact demonstrates extreme asymmetry: Seed financing recovered to 105% of the 2021 peak due to grants and local VC, whilst Series A and Series B remain at 37% and 35% of the peak respectively. This confirms the outflow of international tier-2 venture funds and limited capabilities of local investors for serious scaling rounds.

Compensatory mechanisms in the form of grants (growth from $8 million to $50 million, +525%) partially mitigate the collapse of angel financing, however, do not replace equity financing due to the absence of smart capital, mentorship, and capital structure formation for subsequent rounds.

Analysis of Ukrainian unicorn trajectories confirms the preservation of the ecosystem's ability to generate global technology leaders even during war (Creatio 2024, airSlate 2022), however, the pace slowed by 33% to 0.67 unicorn per year. The critical problem lies in pipeline disruption: seed startups of 2022-2024 may not achieve unicorn status by 2032-2034 due to the absence of Series A/B capital.

Considering the identified "valley of death" inversion and critical deficit of middle-stage capital, the following practical measures are advisable: firstly, creation of a state fund-of-funds to attract international tier-2 venture funds to Series A/B investments with partial risk guarantee; secondly, transformation of grants into convertible instruments for capital structure formation and ensuring financing continuity; thirdly, stimulation of bridge rounds between Seed and Series A to extend startup cash reserves; fourthly, development of a secondary market for early liquidity of founders and angels, which will allow reinvestment in new projects.

Promising directions for further research are: firstly, longitudinal analysis of compensatory mechanism effectiveness through comparison of survival indicators, growth rates, and achievement of subsequent financing stages by startups that received grants compared to startups with equity financing; secondly, tracking trajectories of seed startups of 2022-2024 (n≈450) for empirical verification of the hypothesis about the loss of a generation of potential unicorns due to Series A/B capital deficit; thirdly, comparative analysis of «valley of death» overcoming mechanisms in the Ukrainian ecosystem with other developing ecosystems that experienced exogenous shocks (Israel during intifada, Estonia after USSR collapse, Singapore during Asian financial crisis), for identifying universal patterns and unique adaptation strategies.

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ТРАНСФОРМАЦІЯ МЕХАНІЗМІВ ФІНАНСУВАННЯ УКРАЇНСЬКИХ СТАРТАПІВ: АНАЛІЗ СТАДІЙНИХ РОЗРИВІВ ТА ФЕНОМЕНУ «ДОЛИНИ СМЕРТІ» В УМОВАХ ВІЙНИ

Лоза Д. Ю.

Стаття присвячена дослідженню трансформації механізмів фінансування українських стартапів в умовах повномасштабної війни з фокусом на аналіз стадійних розривів та феномену «долини смерті». Актуальність зумовлена критичними змінами у структурі венчурного фінансування, що загрожує виживанню цілого покоління інноваційних компаній та підриває довгострокову конкурентоспроможність української екосистеми. Метою є виявлення та систематизація розривів у фінансуванні стартапів на різних стадіях розвитку, аналіз трансформації класичної «долини смерті» в умовах воєнного стану та розробка рекомендацій щодо подолання виявлених дисфункцій. Дослідження базується на емпіричному аналізі даних венчурного фінансування з використанням офіційних звітів екосистеми. Ключовим результатом є ідентифікація феномену інверсії «долини смерті»: попри рекордне фінансування найранніших стадій, капітал наступних раундів демонструє критичне скорочення, створюючи ситуацію, коли успішні seed-стартапи не можуть отримати фінансування для масштабування. Виявлено екстремальну асиметрію впливу війни: ранні стадії відновилися завдяки грантам та локальним фондам, проте середні та пізні стадії залишаються на критично низькому рівні через відтік міжнародних венчурних фондів. Доведено обмеженість компенсаторної ролі грантів, які не замінюють пайове фінансування через відсутність менторства, доступу до мереж інвесторів та формування структури капіталу. Встановлено критичну загрозу конвеєру екосистеми: seed-стартапи не зможуть отримати наступні раунди за поточної структури фінансування. Практична значущість полягає у виявленні критичних точок втручання та обґрунтуванні необхідності системних змін у механізмах підтримки стартапів. На основі проведеного аналізу сформульовано пропозиції щодо залучення міжнародного капіталу, трансформації грантового фінансування та забезпечення безперервності фінансування. Оригінальність полягає в першому систематичному аналізі стадійної специфіки впливу війни на венчурне фінансування та концептуалізації феномену інверсії «долини смерті».

Ключові слова: механізми фінансування, стартапи, стадії життєвого циклу, долина смерті, венчурний капітал, українська стартап-екосистема, вплив війни

Transformation of funding mechanisms for Ukrainian startups: analysis of stage gaps and the “valley of death” phenomenon in wartime conditions

TRANSFORMATION OF FUNDING MECHANISMS FOR UKRAINIAN STARTUPS: ANALYSIS OF STAGE GAPS AND THE “VALLEY OF DEATH” PHENOMENON IN WARTIME CONDITIONS

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The article is devoted to the study of transformation of funding mechanisms for Ukrainian startups under full-scale war conditions with focus on analysis of stage gaps and the “valley of death” phenomenon. The relevance is determined by critical changes in the venture financing structure that threaten the survival of an entire generation of innovative companies and undermine the long-term competitiveness of the Ukrainian ecosystem. The aim is to identify and systematise gaps in startup financing at different development stages, analyse the transformation of the classical “valley of death” under wartime conditions, and develop recommendations for overcoming the identified dysfunctions. The research is based on empirical analysis of venture financing data using official ecosystem reports. The key result is the identification of the “valley of death” inversion phenomenon: despite record financing at the earliest stages, capital for subsequent rounds demonstrates critical reduction, creating a situation where successful seed startups cannot obtain financing for scaling. Extreme asymmetry of war impact was revealed: early stages recovered due to grants and local funds, whilst middle and late stages remain at critically low levels due to the outflow of international venture funds. The limited compensatory role of grants was proved, which do not replace equity financing due to the absence of mentorship, access to investor networks, and capital structure formation. A critical threat to the ecosystem pipeline was established: seed startups will not be able to obtain subsequent rounds under the current financing structure. The practical significance lies in identifying critical intervention points and substantiating the necessity of systemic changes in startup support mechanisms. Based on the conducted analysis, proposals were formulated regarding the attraction of international capital, transformation of grant financing, and ensuring financing continuity. The originality lies in the first systematic analysis of stage-specific war impact on venture financing and conceptualisation of the “valley of death” inversion phenomenon.

Keywords: financing mechanisms, startups, life cycle stages, valley of death, venture capital, Ukrainian startup ecosystem, war impact.

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