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*Loza Svitlana^a, Loza Dmytro^b***INVESTMENT ATTRACTIVENESS OF ARTIFICIAL INTELLIGENCE AGENTS:
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The investment attractiveness of artificial intelligence agents was examined as a new class of autonomous systems capable of independent decision-making and performing complex business tasks. The purpose of the study was to assess the economic potential of AI agents based on the analysis of global market dynamics, data from international corporate surveys, and prospects for implementation in the Ukrainian economy. To achieve this purpose, the structure and volumes of investment in the AI agents segment during 2020–2026 were analysed, the results of three large-scale executive surveys (McKinsey, PwC, BCG) on the return on investment in artificial intelligence were systematised, the state of the Ukrainian AI ecosystem was assessed using international rankings, and barriers to scaling agent technologies at the global and national levels were identified. The methodological basis comprised a systematic analysis of scientific literature and empirical data from five international reports of 2025–2026. It was established that the AI agents market was growing at a compound annual growth rate of 45–50%, yet a structural gap existed between the mass adoption of the technology (88% of enterprises) and its full integration into business processes (6% of organisations). A productivity paradox was identified: at the micro level, efficiency increased by 15–40%, whereas the macroeconomic effect remained moderate – no more than 0.66% of total factor productivity growth per decade. It was demonstrated that Ukraine, having risen 14 positions in the Global AI Readiness Index (40th place among 195 countries), was forming a competitive ecosystem with over 240 companies and 5,200 specialists, yet faced a shortage of qualified personnel and limited access to venture capital. Three priority sectors for the deployment of AI agents in Ukraine were identified: IT outsourcing, agriculture, and defence. The results may be used in substantiating investment decisions and formulating state digitalisation policy with due consideration of wartime conditions.

Keywords: artificial intelligence agents, investment attractiveness, return on investment, venture capital, digital transformation, AI ecosystem of Ukraine, implementation barriers.

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Introduction and problem statement

Artificial intelligence was rapidly transforming from an experimental technology into a strategic factor of business competitiveness. The next evolutionary stage following generative artificial intelligence was the emergence of artificial intelligence agents –

autonomous systems capable of purposeful decision-making, self-learning, and executing complex tasks in dynamic environments. Such systems had the potential to substantially transform key business processes: from customer service to strategic supply chain management [1, 2].

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The scale of investment indicated the strategic importance of the technology: in 2025, global spending on artificial intelligence reached USD 1.48 trillion, and the Gartner forecast for 2026 was USD 2.52 trillion – a 44% increase [3]. During the first 11 months of 2025, venture capital investment in generative artificial intelligence rose by 65% compared with the entire 2024 volume, reaching a record USD 87 billion [4]. The AI agents market was valued at USD 5.43 billion (2024) with a projected compound annual growth rate (CAGR) of 45–50% through 2030–2033 [5].

At the same time, a significant gap existed between mass adoption and actual business transformation. According to McKinsey, by 2025, 88% of enterprises had adopted artificial intelligence in at least one business function; however, only 6% had achieved full transformation at the organisational level [6]. In the 29th global survey of 4,454 executives, PwC found that 56% of CEOs had recorded neither revenue growth nor cost reduction as a result of investment in artificial intelligence [7]. This indicated a systemic problem in realising the technology's potential.

Despite the prolonged war, Ukraine demonstrated significant progress in developing the artificial intelligence ecosystem. The country rose 14 positions to 40th place among 195 states in the 2025 Global Artificial Intelligence Readiness Index [8]. Ukraine had over 240 companies in the field of artificial intelligence and 5,200 specialists, while stable IT exports provided the technological base for scaling [9]. At the same time, Ukrainian companies faced infrastructure limitations, a shortage of qualified personnel, and the need to adapt global practices to wartime conditions [10, 11].

In this context, the study of the investment attractiveness of AI agents acquired particular relevance – both for understanding global patterns and for determining the prospects of Ukrainian business based on empirical data regarding return on investment, barriers to adoption, and international experience.

Analysis and review of publications

The economic effects of artificial intelligence were actively studied in the scientific literature, particularly following the rapid development of generative models. In the work of Acemoglu D. (NBER Working Paper, 2024), based on a task automation model, the macroeconomic consequences of artificial intelligence were assessed: even under optimistic assumptions, the total increase in total factor productivity (TFP) over 10 years would not exceed 0.66%, which called into question the inflated expectations regarding the technology's transformative impact [1].

At the same time, micro-level studies demonstrated considerably higher effects. In the experiment by Noy S. and Zhang W., published in *Science* (2023), 453 professionals performed writing tasks with and without access to ChatGPT. The results showed a 40% reduction in task completion time and an 18% improvement in quality, with the effect being greatest for workers with lower initial productivity [12]. Brynjolfsson E., Li D., and Raymond L., in a study published in the *Quarterly Journal of Economics* (2025), confirmed this finding on a larger sample: based on data from 5,172 customer service agents, access to generative artificial intelligence increased productivity by 15%, and for the least experienced workers – by 30% [13].

Babina T., Fedyk A., He A., and Hodson J. (2024) proposed a new approach to measuring the impact of artificial intelligence at the firm level. Based on the analysis of employee CVs, the authors found that companies investing in artificial intelligence demonstrated higher growth in sales, employment, and market value, with this growth realised primarily through product innovations. An important finding was the concentration of AI-induced growth among large firms, which increased industry concentration [14].

At the macro level, the OECD study (2025) estimated the potential annual labour productivity gain from artificial intelligence at 0.4–1.3 percentage points for G7 economies with a high level of artificial intelligence utilisation, whereas for the remaining G7 countries, the benefits could be half as large [15]. The IMF Working Paper ‘The Global Impact of AI: Mind the Gap’ (2025) projected global GDP growth of 1.3–4% over the next decade with a baseline TFP increase of 0.8–2.4%, yet warned of an uneven distribution of benefits between developed economies and developing countries [2].

Regarding agent-based artificial intelligence systems, the study by Joshi S. (IJIREM, 2025), which covered 65 contemporary sources for 2024–2025, documented a paradigmatic shift from passive generative artificial intelligence to autonomous agent systems. The deployment of multi-agent systems delivered a 40–60% increase in process efficiency, a 50% reduction in operational errors, and a 35% acceleration of decision-making cycles [16].

At the same time, the literature review revealed a number of unresolved issues. First, research on the investment attractiveness of AI agents for countries with transitional economies, particularly under conditions of armed conflict, was practically absent. Second, a significant gap existed between micro- and macro-level assessments of the effects of artificial intelligence: large-scale surveys (PwC, McKinsey)

recorded a discrepancy between expectations and actual financial results. Third, the experience of forming the artificial intelligence ecosystem in Ukraine required systematisation in the context of the ambitious national strategy of entering the top three global leaders in artificial intelligence adoption by 2030 [10].

Purpose of the article

The purpose of the article was to assess the investment attractiveness of AI agents based on the analysis of global market trends, empirical data on return on investment, and the identification of prospects for Ukrainian business. The study was grounded in the scientific premise of a systemic gap between the mass adoption of artificial intelligence (88% of enterprises) and actual business transformation (6% of organisations), which indicated insufficient empirical substantiation of investment decisions [6, 7]. The central idea lay in a comprehensive assessment of the investment attractiveness of AI agents through the juxtaposition of micro-level productivity indicators with macroeconomic forecasts and the specifics of transitional economies under conditions of conflict, thereby complementing existing research focused predominantly on developed countries [1, 2].

To achieve the stated purpose, the following tasks were addressed: to analyse the dynamics of the global AI agents market and the structure of investments during 2020–2026; to systematise empirical data on return on investment in artificial intelligence at the micro and macro levels based on international surveys (McKinsey, PwC, BCG); to assess the state and prospects of the artificial intelligence ecosystem development in Ukraine using international rankings and the experience of startup ecosystem transformation [11, 17]; to identify key barriers to the adoption of agent systems and to formulate recommendations for Ukrainian enterprises with due consideration of the national digital transformation strategy through 2030 [10].

The study was based on a systematic analysis of scientific literature on the economic effects of artificial intelligence and agent systems [1, 2, 12–15], as well as empirical data from five large-scale international reports of 2025–2026 [3, 6, 7, 18].

Presentation of the main material

The global AI agents market was at a stage of rapid growth that exceeded most previous technological cycles. According to Grand View Research estimates, in 2024 the market volume was USD 5.43 billion, and by 2033 it could grow to USD 182.97 billion at a compound annual growth rate (CAGR) of 49.6%. The United States market, as the largest segment, was valued at USD 1.56 billion (2024) with a forecast of USD 69.06 billion by 2034 [5]. By segment distribution, enterprises accounted for 67.1% of the

market, while multi-agent systems demonstrated the highest growth dynamics. The Asia-Pacific region led in growth rates, although North America retained 41% of the total volume.

Total global spending on artificial intelligence also demonstrated unprecedented dynamics. According to Gartner forecasts, in 2026 it could reach USD 2.52 trillion (a 44% increase compared with USD 1.48 trillion in 2025), and by 2027 – USD 3.3 trillion. At the same time, spending on AI-optimised servers was projected to grow by 49% by 2026, accounting for 17% of total technology spending [3].

Venture capital in generative artificial intelligence demonstrated record dynamics. According to EY, total investment in generative artificial intelligence during the first 11 months of 2025 reached USD 87 billion, which was 65% higher than the annual figure for 2024 (USD 52.5 billion) and 350% higher than the figure for 2023 (USD 24.7 billion) [4]. Sovereign wealth funds became significant market participants, facilitating deals totalling USD 46 billion in 2025, driven by the priority of technological sovereignty. At the same time, the number of deals decreased by 35%, indicating market maturity and capital concentration in large rounds with companies that had proven business models.

The dynamics of investment were clearly illustrated by Fig. 1. Over five years, the volume of venture financing in generative artificial intelligence grew 26-fold – from USD 3.3 billion in 2020 to USD 87 billion during the first 11 months of 2025, with the most rapid growth occurring in 2023–2025, coinciding with the emergence and mass deployment of agent systems. The quantitative parameters of these trends were systematised in Table 1.

The data in Table 1 attested to the nonlinear nature of market development: whilst venture financing of generative AI grew 26-fold over five years, the adoption of agent-based artificial intelligence by enterprises made a leap from less than 1% to 23% within a single year [6, 18]. Such asymmetry between investment volumes and the pace of corporate adoption indicated that a significant share of capital was being directed towards building infrastructure and foundational models rather than end-user deployment in business processes. This created a deferred effect, the realisation of which was expected during 2026–2028.

The analysis of return on investment was key to assessing the investment attractiveness of AI agents, as it enabled the identification of discrepancies between indicators at the micro and macro levels. Large-scale executive surveys recorded a significant gap between expectations and actual results.

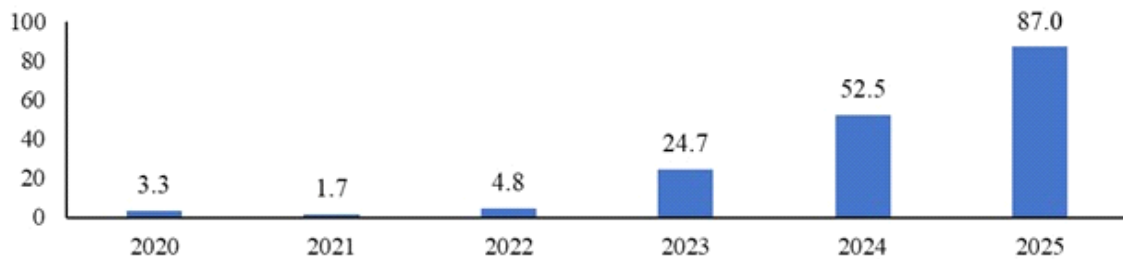


Fig. 1. Dynamics of venture capital investment in generative AI, USD billion (2020–2025)

Source: compiled by the authors based on data from [4]

Table 1

Dynamics of global investment in artificial intelligence and the AI agents market (2020–2026)

Indicator	2020	2021	2022	2023	2024	2025	2026
VC in GenAI, USD bn	3.3	–	–	24.7	52.5	87.0*	–
AI spending, USD trn	–	–	–	–	1.05	1.48	2.52
AI agents market, USD bn	–	–	–	–	5.43	7.29–8.29**	9.14–12.06**
AI adoption, %	50	50	50	55	72	88	–
Agentic AI, %	–	–	–	–	<1	23	–

Note: * Data for the first 11 months of 2025; ** estimates from various analytical agencies.

Source: compiled by the authors based on data from [3–6, 18]

In January 2026, in the 29th global survey of 4.454 CEOs from 95 countries, PwC found that 56% of companies had recorded neither revenue growth nor cost reduction as a result of the deployment of artificial intelligence [7]. Approximately 30% of executives reported revenue growth, 26% reported cost reductions of 2% or more, whilst 22% encountered increased costs. Only 12% of companies, which PwC designated as the ‘vanguard’, achieved simultaneous revenue growth and cost reduction. Characteristically, these companies had two to three times stronger technological foundations and deeper integration of artificial intelligence into marketing, strategic planning, and products.

A more optimistic perspective was provided by BCG AI Radar 2026: 90% of executives believed that AI agents would deliver measurable ROI by the end of 2026, and companies planned to double their spending on artificial intelligence to 1.7% of revenue [18]. Agent-based artificial intelligence already accounted for over 30% of investment in the technology. At the same time, 94% of executives declared their readiness to continue investing even in the absence of immediate results, which indicated the strategic nature of the decisions.

At the micro level, empirical data were considerably more optimistic. In the study by Brynjolfsson E. et al. (2025), access to generative artificial intelligence delivered a 15% increase in the productivity of customer support agents [13]. Noy S. and Zhang W. (2023) in an experimental study recorded a 40% reduction in task completion time and an 18% improvement in quality [12]. BCG estimated that AI agents accelerated business processes in finance, procurement, and customer service by 25–40% and reduced time spent on routine work by 30–50% [18]. In the customer service domain, AI-based agents processed up to 80% of standard queries and halved service time.

The long-term potential was confirmed by macroeconomic estimates. The IMF projected global GDP growth of 1.3–4% over the next decade with a baseline TFP increase of 0.8–2.4% [2]. The OECD projected annual labour productivity growth of 0.4–1.3 percentage points for G7 countries [15]. At the same time, Acemoglu D. (2024) provided a more restrained estimate – less than 0.66% of TFP over ten years, justifying this by the uncertainty regarding the scale of task automation and the likely uneven distribution of benefits [1].

It was precisely this discrepancy between micro-level successes and macroeconomic restraint that defined the current stage of market development. Gartner characterised it as the ‘trough of

disillusionment’ in the classic hype cycle, when the mass adoption of the technology had not yet been transformed into systemic economic effects [3].

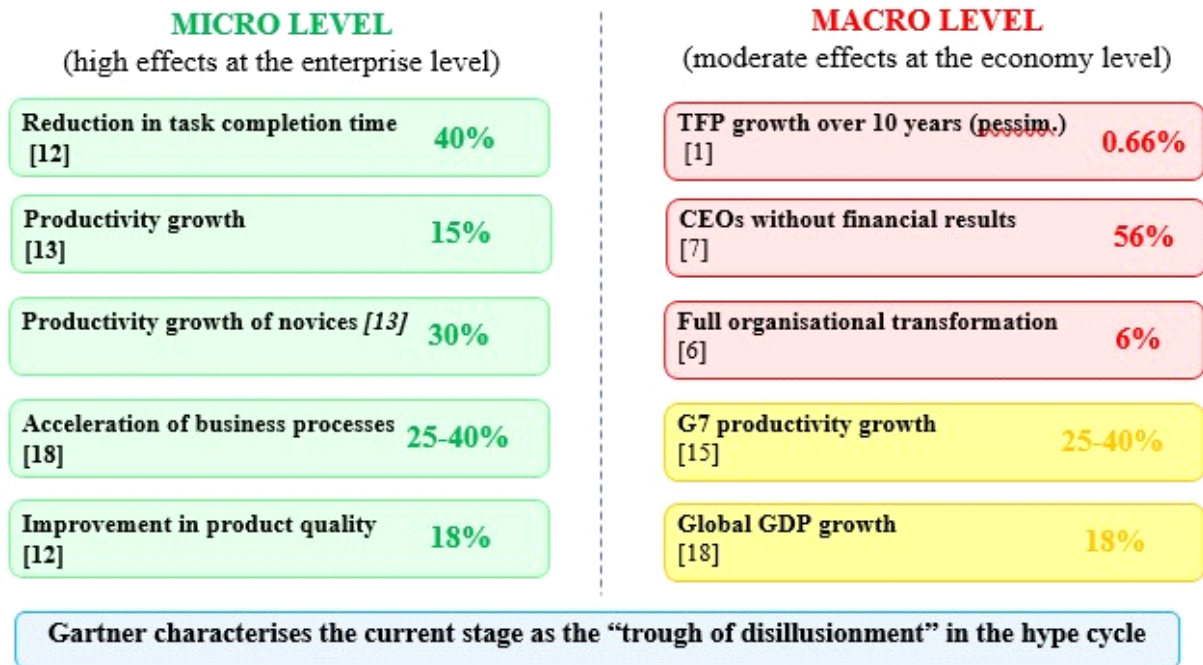


Fig. 2. The AI productivity paradox: micro and macro levels

Source: compiled by the authors based on data from [1, 2, 6, 7, 12, 13, 15, 18]

At the micro level, the effects were significant and statistically confirmed: a 40% reduction in task completion time [12], a 15% productivity increase (and 30% for the least experienced workers) [13], and a 25–40% acceleration of business processes [18]. At the same time, at the macro level the picture was fundamentally different: TFP growth over 10 years did not exceed 0.66% [1], 56% of CEOs reported no financial results [7], and only 6% of organisations achieved full transformation [6]. This gap was explained by three factors: first, micro-level studies were

conducted under controlled conditions with ‘clean’ data, whereas actual deployment encountered integration complexity and organisational resistance; second, benefits were distributed unevenly across sectors and countries; third, a time lag existed between technology adoption and its macroeconomic effect, which was characteristic of general-purpose technologies.

A comparison of the results of three independent global surveys was presented in Table 2.

Table 2

Empirical data on return on investment in artificial intelligence: results of global surveys (2025–2026)

Study	Sample	Key ROI indicator	Barriers
PwC 29th CEO Survey (2026) [7]	4,454 CEO, 95 countries	56% – no results; 12% – 'vanguard'	Immature AI foundation
McKinsey State of AI 2025 [6]	1,993 companies, 105 countries	88% adoption; 6% – transformation	74% do not scale AI
BCG AI Radar 2026 [18]	2.360 executives, 16 markets	90% expect ROI from agents in 2026	Gap between leaders and followers

Source: compiled by the authors based on data from [6, 7, 18]

The data from three independent surveys (Table 2) revealed a common pattern: the mass adoption of artificial intelligence did not ensure an automatic return on investment. The gap between the 88% adoption rate and 6% full transformation [6] indicated a structural nature of the problem rather than temporary difficulties. It was noteworthy that 12% of ‘vanguard’ companies, which achieved simultaneous revenue growth and cost reduction [7], had two to three times stronger technological foundations – consequently, positive ROI required not a piecemeal application of the technology but a systemic restructuring of infrastructure. At the same time, the declared 90% optimism regarding ROI from AI agents in 2026 [18] contrasted with actual results, pointing to the predominantly strategic rather than operational nature of current investment decisions.

Despite the prolonged war, Ukraine demonstrated significant progress in forming the artificial intelligence ecosystem. According to the Oxford Insights Government AI Readiness Index 2025, the country rose 14 positions to 40th place among 195 states [8]. In a number of indicators, particularly the level of digitalisation of public services (99.63%) and compliance with international standards (92.25%), Ukraine already surpassed certain indicators of leading countries.

At the WINWIN Summit 2025, the Ministry of Digital Transformation presented the National Artificial Intelligence Development Strategy through 2030 with three priority directions: practical application of artificial intelligence in public administration, defence, business, education, and healthcare; development of sovereign national models and products; and strengthening infrastructure and human capital. The strategic goal was defined as entering the top three global leaders in artificial intelligence adoption by 2030 [10]. Among the specific target benchmarks were at least 50% annual growth in the number of artificial intelligence startups and the creation of an advanced regulatory framework. As noted by Loza S. P. and Loza D. Yu. (2025), international experience indicated that it was precisely systemic state support – tax incentives, simplified regulation, and targeted financing – that served as a catalyst for the formation of competitive startup ecosystems [17].

In 2025, a number of notable results were achieved: the WINWIN AI Centre of Excellence commenced operations as a governmental competence centre; Diia.AI was launched – the world’s first national AI-based assistant for public services, which processed 90% of citizens’ queries; the AI Factory infrastructure and the Sandbox regulatory sandbox for testing innovative products were established; and a partnership with NVIDIA for the development of sovereign artificial

intelligence was signed [10].

The IT sector remained the strategic foundation for the deployment of artificial intelligence. According to Lviv IT Cluster data, in 2024, IT services exports totalled USD 6.45 billion, and during the first 11 months of 2025, they reached USD 5.97 billion with a forecast of USD 6.6 billion for the year [9]. The increase in the share of IT in total services exports from 38.5% (first half of 2024) to 43% (first half of 2025) attested to the sector’s resilience even amid an overall decline in exports. Loza D.Yu. (2025) analysed this dynamic in detail, documenting the transition of the startup ecosystem from stable growth to adaptation under wartime conditions [11]. Notably, even amid the contraction of overall venture financing in Ukraine, AI startups demonstrated countercyclical resilience – a trend that corresponded with the global trend of venture capital concentration in the AI sector (a 65% increase in 2025 according to EY data [4]). This indicated that the investment attractiveness of artificial intelligence was to a significant extent resilient to exogenous shocks, including armed conflicts.

Ukraine held second place among the countries of Central and Eastern Europe by the number of companies in the field of artificial intelligence – over 240 as of 2025. Over the past decade, the number of specialists had grown fivefold, reaching 5,200 persons, and the forecasts of the Ministry of Digital Transformation projected a 330% increase in demand in the coming years. The Diia.City legal framework also demonstrated notable dynamics: as of February 2026, 3,707 residents were registered, which was double the figure from the previous year, with 87% of new residents being young companies registered less than a year before joining.

A comparison with peer countries enabled an assessment of Ukraine’s potential. Israel (1st place in the Government AI Readiness Index with a population of 9.8 million) built its AI ecosystem on the basis of defence technologies and venture capital – a model relevant to Ukraine with its Defence Tech experience. Estonia (21st place, population 1.3 million) achieved leadership through the digitalisation of public services – a direction where Ukraine already demonstrated competitive results (Diia.AI, 99.63% digitalisation). Poland (36th place, population 38 million) – the closest structural analogue – was only 4 positions ahead of Ukraine despite having a considerably larger economy, which attested to the high effectiveness of Ukrainian efforts relative to the resource base [8]. At the same time, the gap with leaders remained substantial: the top-10 countries had 5–10 times more venture funding per capita and considerably more developed computing infrastructure.

As shown in Fig. 3, Ukraine (40th place) lagged behind its structural analogue Poland by only 4 positions, whilst having a considerably smaller economy. The Estonian model of public services digitalisation was the most relevant for Ukraine given

a similar development trajectory (Diia.AI, 99.63% digitalisation), whereas the Israeli experience of converting defence technologies into the commercial sector corresponded to Ukraine’s Defence Tech potential.

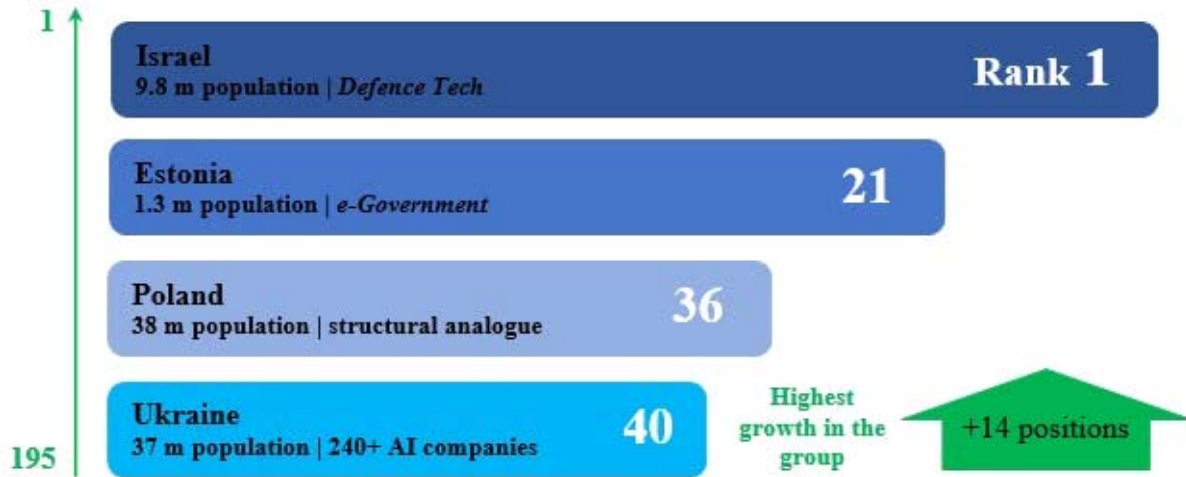


Fig. 3. Ukraine’s position in the Government AI Readiness Index 2025 among peer countries

Source: compiled by the authors based on data from [8]

The key indicators of the development of the Ukrainian AI ecosystem were presented in Table 3.

Table 3

Key indicators of the development of the Ukrainian AI ecosystem (2024–2025)

Indicator	2024	2025	Dynamics
Government AI Readiness Index, rank	54	40	+14 positions
Number of AI companies	200	240+	Growth
Number of AI specialists	4,500	5,200	+15.6%
IT services exports, USD bn	6.45	6.60*	+2.3%
Share of IT in services exports (H1), %	38.5	43.0	+4.5 pp
Digitalisation of public services, %	–	99.63	Record
Diia queries processed by AI, %	–	90	New
Diia.City residents	1,500	3,707**	+147%

Note: * Forecast based on data for 11 months of 2025; ** as of February 2026

Source: compiled by the authors based on data from [8–10]

The data in Table 3 indicated the formation of a critical mass of the AI ecosystem in Ukraine: the 14-position rise in the ranking correlated with a 15.6% increase in the number of specialists and a doubling of Diia.City residents. At the same time, the estimated skills deficit (+330% demand) remained the key constraint on scaling. The growth in the share of IT in total services exports from 38.5% to 43% within a year attested to the structural strengthening of the sector, which served as the foundation for the deployment of agent technologies, even amid an overall contraction in foreign trade.

An additional stimulus for the development of artificial intelligence in Ukraine was provided by the defence sector: over 200 solutions based on artificial intelligence and machine learning had been deployed, and the BRAVE1 cluster facilitated the formation of the defence technology ecosystem. In 2025, FPV drone production grew 2.5-fold to 3 million units, and capacity as of 2026 enabled the production of over 8 million per year.

Ukrainian SaaS companies were actively integrating artificial intelligence capabilities. In May 2025, Grammarly raised USD 1 billion in non-dilutive

financing from General Catalyst at a valuation of USD 13 billion with projected annual revenue of USD 700 million. In June 2024, Creatio raised USD 200 million at a valuation of USD 1.2 billion, officially becoming a Ukrainian ‘unicorn’ with annual growth rates of 45%.

Barriers to Adoption and Factors of Investment Attractiveness. The study of barriers to the adoption of AI agents revealed systemic problems at both the global and national levels. According to McKinsey (2025), although 88% of enterprises already used artificial intelligence, only 6% had achieved full transformation at the organisational level [6]. The gap between experimentation and scaling was driven by several key factors.

First, the problem of staffing remained acute. Companies predominantly chose to train existing employees rather than create new specialised roles, which slowed the integration of artificial intelligence into core business processes. Second, most organisations lacked mature governance models for autonomous agents, which complicated the transition from pilot projects to production environments.

The so-called ‘pilot trap’ was a characteristic feature of the current stage and required more detailed analysis. The causal chain was as follows: pilot projects were implemented on limited samples with ‘clean’ data and demonstrated convincing results within 2–4 months. However, upon scaling, a cascade of problems emerged: integration with legacy systems

required data architecture redesign; compliance assurance (particularly in the financial and healthcare sectors) added 3–6 months to the deployment cycle; and the demand for specialised personnel to support agent systems exceeded the available supply in the labour market. As a consequence, scaling costs were 3–5 times higher than pilot costs, which came as a surprise to companies that had budgeted on the basis of pilot indicators [18, 6].

The scale of losses at each stage of adoption was clearly illustrated by Fig. 4. The largest gap – 65 percentage points – was observed between overall AI adoption (88%) and the use of agent systems (23%); agent-based AI required a fundamentally different level of autonomous decision-making, which necessitated mature data architecture and risk management. The second critical transition – from pilot project to measurable ROI (from 23% to 12%) – was caused precisely by the ‘pilot trap’: scaling costs were 3–5 times higher than pilot costs due to integration with legacy systems and compliance assurance. The final transition to full transformation (from 12% to 6%) required not only technological but also organisational changes – the restructuring of processes and business models. For Ukrainian companies, additional barriers included limited access to venture capital and regulatory uncertainty regarding the EU AI Act, whilst the compactness of the market and the absence of cumbersome legacy systems in young companies created preconditions for faster progression through the ‘funnel’.

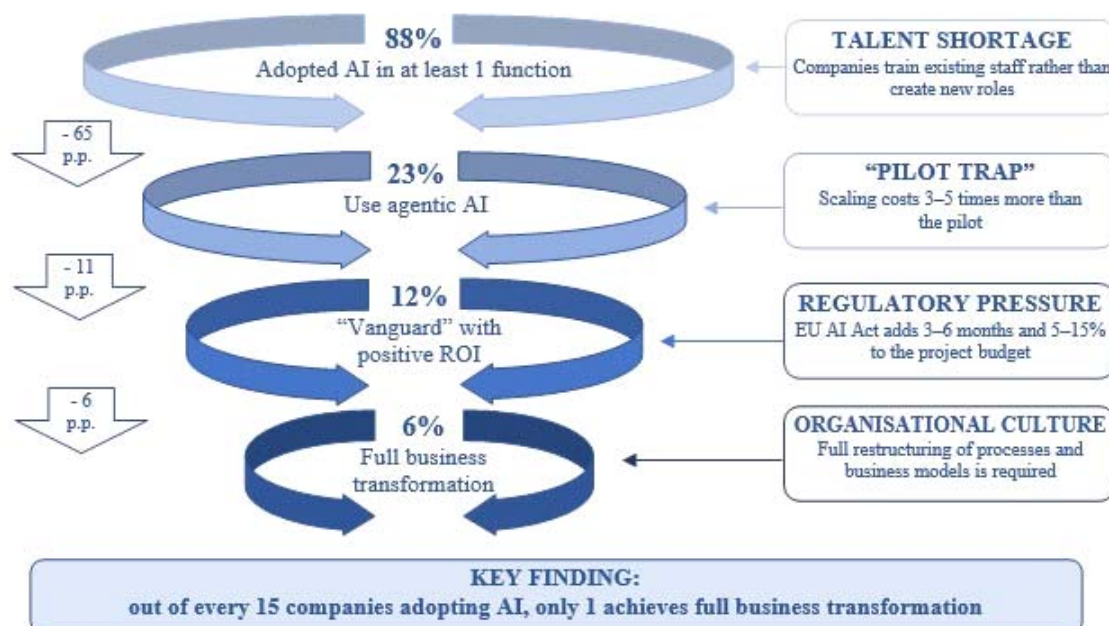


Fig. 4. The AI agents adoption funnel: from pilot to transformation

Source: compiled by the authors based on data from [6, 7, 18]

Third, the sovereignty of artificial intelligence was becoming an increasingly important strategic factor: companies were increasingly taking into account the geography of technology development when selecting a provider. For Ukraine, this simultaneously created a challenge – dependence on external infrastructure and models – and an opportunity through the development of its own language model and AI Factory [10]. The IMF warned that countries with developing markets could receive fewer short-term benefits from artificial intelligence due to the concentration of production in sectors with lower sensitivity to automation and lower readiness for adoption [2]. This underscored the necessity of purposeful investment in infrastructure and human capital.

Fourth, an important external factor for Ukraine was the entry into force of the EU AI Act (August

2025). As a candidate country for EU membership, Ukraine was obligated to harmonise its regulatory environment, which created a dual effect on investment attractiveness. On the one hand, compliance with European standards enhanced the confidence of international investors and opened access to the EU market for Ukrainian AI solutions. On the other hand, compliance costs for high-risk systems (and most agent systems in the financial and healthcare sectors fell precisely into this category) could amount to 5–15% of the total project budget, which was particularly burdensome for small and medium-sized enterprises.

A systematisation of adoption barriers comparing global and Ukrainian realities was presented in Table 4.

Table 4

Comparison of barriers and factors in the adoption of AI agents

Factor	Global situation	Ukraine-specific context	Source
Personnel	Companies train rather than restructure roles	5,200 specialists; demand +330%	[6], [9]
Infrastructure	43% readiness for scaling	AI Factory; NVIDIA; wartime constraints	[6], [10]
Governance	Most lack mature models for agents	Sandbox; AI CoE operational	[6], [10]
Sovereign AI	Geography of development influences provider selection	National LLM; Diia.AI	[18], [10]
ROI gap	56% of CEOs with no financial results	Limited data; Defence Tech	[7], [10]
Scaling	6% achieved full transformation	Goal – top 3 by 2030; VC limited	[6], [10]

Source: compiled by the authors based on data from [6, 7, 9, 10, 18]

The comparison enabled the identification of a specific configuration of factors for Ukraine: in three of the six parameters (personnel, infrastructure, ROI gap), the country experienced the same constraints as the global market, albeit with additional complications arising from wartime conditions. At the same time, in the parameters of governance and sovereign AI, Ukraine had already established an institutional foundation (Sandbox, AI CoE, national LLM), which reduced the gap with leading countries. The decisive contradiction was the ambitious goal of entering the top three global leaders by 2030 amid limited venture financing – overcoming this contradiction was possible through the conversion of defence technologies and integration with European markets in accordance with EU AI Act requirements.

Despite the aforementioned challenges, artificial intelligence remained a strategically attractive investment direction. The market demonstrated a

CAGR of 45–50%, which exceeded the indicators of most competing technological sectors [5]. 94% of executives declared their readiness to continue investing even without immediate results [18]. The experience of ‘vanguard’ companies confirmed the possibility of achieving positive ROI provided that a robust technological foundation was established [7].

For Ukraine, additional attractiveness factors included the largest pool of IT talent in Central and Eastern Europe, a growing AI ecosystem with over 240 companies, state support through the WINWIN AI Centre and Sandbox, as well as unique defence technology experience with the potential for export to international markets [10, 9, 8].

Based on the analysis conducted, three priority sectors for the deployment of AI agents in Ukraine could be identified. The first was IT outsourcing, where AI agents were capable of accelerating development, testing, and customer support processes by

25–40% [18], which directly enhanced the competitiveness of Ukrainian companies in the global market with an export volume of USD 6.6 billion [9]. The second was the agricultural sector, where the high share of routine operations in logistics, procurement, and supply chain management created preconditions for rapid payback: according to BCG, it was precisely these functions that demonstrated the highest effect from agent-based automation [18]. The third was the defence sector, where over 200 already deployed AI solutions formed unique experience that could be converted into commercial products for the international defence technology market.

Conclusions

The study of the investment attractiveness of AI agents revealed the formation of a new paradigm of corporate technological investments, which fundamentally differed from previous waves of digitalisation in the scale of economic effects and the speed of payback.

It was established that the global AI agents market was in a phase of exponential growth with a projected CAGR of 45–50% through 2030–2033, with investment activity concentrated predominantly in three sectors – financial services, healthcare, and customer service [18, 3, 5]. At the same time, the analysis of corporate deployments revealed significant differentiation of results: at an 88% adoption rate, only 6% of organisations had achieved full transformation at the enterprise level [6], which indicated the presence of systemic barriers at the stage of transition from experimentation to full-scale integration.

The scientific novelty of the study lay in the systematisation of quantitative indicators of the investment attractiveness of AI agents across three levels – macroeconomic, corporate, and venture. In particular, a paradox was identified between high productivity at the individual worker level (a 15% increase according to [13]) and a moderate macroeconomic effect (TFP growth of no more than 0.66% over ten years according to [1]), which was explained by the unevenness of adoption and institutional constraints. The generalisation of the venture cycle enabled the documentation of the market’s transition from financing foundational models to investing in applied AI agent solutions, where the share of corresponding deals reached 30% of venture financing in the technology sector [4].

The practical significance of the results obtained was determined by the possibility of their use in substantiating investment decisions regarding the deployment of AI agents by Ukrainian enterprises. It was established that Ukraine held 40th place in the

global AI readiness ranking [8], whilst possessing a robust IT sector with over 5,200 specialists in the field of AI [9] and a positive dynamic of state support [10]. The recommendations developed regarding priority sectors for adoption (agricultural, defence, IT outsourcing) took into account the specifics of the national economy and could be used both by public administration bodies in formulating digitalisation support policy and by businesses in planning technological investments.

Promising directions for further research included: first, an empirical analysis of ROI from the deployment of AI agents on a sample of Ukrainian enterprises across various economic sectors for the verification of international indicators in the national context; second, a study of the impact of the regulatory environment on the pace of adoption of agent technologies in developing countries, with particular attention to the role of the EU AI Act for associated countries; third, the development of a methodology for assessing the investment attractiveness of specific AI agent solutions with due consideration of sectoral specifics and the level of digital maturity of the enterprise.

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ІНВЕСТИЦІЙНА ПРИВАБЛИВІСТЬ АГЕНТІВ ШТУЧНОГО ІНТЕЛЕКТУ: ГЛОБАЛЬНІ ТЕНДЕНЦІЇ ТА ПЕРСПЕКТИВИ ДЛЯ УКРАЇНСЬКОГО БІЗНЕСУ

Ло́за Світла́на, Ло́за Дми́тро

У статті досліджено інвестиційну привабливість агентів штучного інтелекту як нового класу автономних систем, здатних самостійно приймати рішення та виконувати складні бізнес-завдання. Мета роботи – оцінити економічний потенціал ШІ-агентів на підставі аналізу глобальної ринкової динаміки, даних міжнародних корпоративних опитувань та перспектив впровадження в українську економіку. Для досягнення мети проаналізовано структуру та обсяги інвестицій у сегмент ШІ-агентів за 2020–2026 роки, систематизовано результати трьох масштабних опитувань керівників (McKinsey, PwC, BCG) щодо рентабельності вкладень у штучний інтелект, оцінено стан ШІ-екосистеми України за міжнародними рейтингами, а також ідентифіковано бар'єри масштабування агентних технологій на глобальному та національному рівнях. Методологічну основу становить систематичний аналіз наукової літератури та емпіричних даних п'яти міжнародних звітів 2025–2026 років. Встановлено, що ринок ШІ-агентів зростає із середньорічним темпом 45–50%, проте між масовим впровадженням технології (88 % підприємств) та її повною інтеграцією у бізнес-процеси (6% організацій) існує структурний розрив. Зафіксовано парадокс продуктивності: на мікрорівні ефективність зростає на 15–40%, тоді як макроекономічний ефект залишається помірним – не більше 0,66% приросту сукупної факторної продуктивності за десятиліття. Показано, що Україна, піднявшись на 14 позицій у глобальному індексі готовності до ШІ (40-те місце серед 195 країн), формує конкурентоспроможну екосистему з понад 240 компаніями та 5200 спеціалістами, однак стикається з дефіцитом кадрів та обмеженим доступом до венчурного капіталу. Визначено три пріоритетні сектори для впровадження ШІ-агентів в Україні: ІТ-аутсорсинг, аграрний та оборонний. Результати можуть бути використані при обґрунтуванні інвестиційних рішень та формуванні державної політики цифровізації з урахуванням специфіки воєнного стану.

Ключові слова: агенти штучного інтелекту, інвестиційна привабливість, рентабельність інвестицій, венчурний капітал, цифрова трансформація, ШІ-екосистема України, бар'єри впровадження.

INVESTMENT ATTRACTIVENESS OF ARTIFICIAL INTELLIGENCE AGENTS: GLOBAL TRENDS AND PROSPECTS FOR UKRAINIAN BUSINESS

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The investment attractiveness of artificial intelligence agents was examined as a new class of autonomous systems capable of independent decision-making and performing complex business tasks. The purpose of the study was to assess the economic potential of AI agents based on the analysis of global market dynamics, data from international corporate surveys, and prospects for implementation in the Ukrainian economy. To achieve this purpose, the structure and volumes of investment in the AI agents segment during 2020–2026 were analysed, the results of three large-scale executive surveys (McKinsey, PwC, BCG) on the return on investment in artificial intelligence were systematised, the state of the Ukrainian AI ecosystem was assessed using international rankings, and barriers to scaling agent technologies at the global and national levels were identified. The methodological basis comprised a systematic analysis of scientific literature and empirical data from five international reports of 2025–2026. It was established that the AI agents market was growing at a compound annual growth rate of 45–50%, yet a structural gap existed between the mass adoption of the technology (88% of enterprises) and its full integration into business processes (6% of organisations). A productivity paradox was identified: at the micro level, efficiency increased by 15–40%, whereas the macroeconomic effect remained moderate – no more than 0.66% of total factor productivity growth per decade. It was demonstrated that Ukraine, having risen 14 positions in the Global AI Readiness Index (40th place among 195 countries), was forming a competitive ecosystem with over 240 companies and 5,200 specialists, yet faced a shortage of qualified personnel and limited access to venture capital. Three priority sectors for the deployment of AI agents in Ukraine were identified: IT outsourcing, agriculture, and defence. The results may be used in substantiating investment decisions and formulating state digitalisation policy with due consideration of wartime conditions.

Keywords: artificial intelligence agents, investment attractiveness, return on investment, venture capital, digital transformation, AI ecosystem of Ukraine, implementation barriers.

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