ITBRIDGE

EU-UKRAINE DIGITAL SECTOR INTERLINKAGES REPORT

Comprehensive analysis of the EU-Ukraine Digital Ecosystems Interconnections

Deliverable D2.1 | 18.11.2025

Co-funded by the European Union

The ITBridge project is funded by the European Union through the Single Market Programme under the grant agreement №101196018. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Innovation Council and SMEs Executive Agency (EISMEA). Neither the European Union nor the granting authority can be held responsible for them.

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Disclaimer: This report is based on data available up to 30.09.2025. The rapidly evolving geopolitical and economic situation may affect the long-term accuracy of certain forecasts. The analysis represents the expert opinions gathered and should be used as a strategic guide, not as a definitive prediction of future events.

1. EXECUTIVE SUMMARY

This report, a key deliverable of the ITBridge project, provides a strategic analysis of the digital sectors in the European Union (EU) and Ukraine, identifying critical opportunities, barriers, and pathways for deeper cooperation. It is intended to guide policymakers, businesses, and support organisations in fostering resilient, mutually beneficial partnerships that strengthen the EU's digital sovereignty and accelerate Ukraine's economic integration.

1.1. Key Findings

- **A "Golden Triangle of Opportunity"**
  A strong strategic alignment exists between the EU's high-demand gaps, Ukraine's proven tech capabilities, and the expressed interest of EU industries in collaboration. The most promising areas for immediate, high-impact collaboration are Industry 4.0/5.0, AI & Machine Learning, and Cybersecurity.
- **Ukraine's Resilient and Specialised IT Sector**
  Despite the war, Ukraine's digital sector remains a key economic pillar, accounting for 37.7% of all services exports in 2024. It possesses world-class, battle-tested expertise in Cybersecurity, Unmanned Vehicles, and mature capabilities in Web Platforms, Big Data, and AI & ML.
- **EU's Strategic Dependencies**
  The EU faces critical dependencies on non-EU providers for foundational technologies, particularly in Semiconductors, and significant structural dependencies in AI & ML and Cloud/Edge Computing. This creates a strategic imperative to build partnerships with trusted, capable allies like Ukraine.
- **The Inertial Scenario Risk**
  Without proactive intervention, the current trajectory risks a "Formal Partners, Slow Movers" scenario. This would lead to superficial cooperation, a "brain drain" of Ukrainian talent without value creation, and a missed opportunity for the EU to bolster its strategic autonomy and competitiveness.
- **Key Barriers to Integration**
  Major obstacles include investment uncertainty due to the war, a "funding gap" for Ukrainian SMEs (as traditional financing models are ill-suited for intangible assets), administrative barriers to mobilizing IT specialists, and the systemic challenge of transitioning Ukraine's private sector away from hostile (e.g., Russian) enterprise software.

1.2. Strategic Recommendations

For Policymakers:

- ☐ Create Targeted Financial Instruments: develop EU-backed financial mechanisms (e.g., venture funds, guarantee schemes) that recognize intangible assets to close the funding gap for Ukrainian tech SMEs.
- ☐ Streamline Mobility and Skills Recognition: establish a "green corridor" for Ukrainian IT specialists for essential business travel and simplify the cross-border recognition of professional qualifications.
- ☐ Accelerate Regulatory Harmonization and Standards Alignment: prioritize and fast-track the alignment of Ukraine's digital market regulations with EU standards, particularly for data protection, cybersecurity, and technical ICT standards. Ensuring that Ukrainian ICT solutions adopt European harmonized standards is essential for conformity under the AI Act, Cyber Resilience Act, and other upcoming regulations. At the political level, this requires closer collaboration between the Ukrainian National Standards Body and EU Standards Development Organisations:
  - For Business Support Organisations (BSOs): Raise awareness among companies of European ICT standards and support their adoption. Assist companies willing to participate in standards development at the Ukrainian, European, and international levels.

- For Companies: Invest in adopting relevant ICT standards. Actively engage in standards-making processes to ensure their solutions are compliant and competitive in EU and international markets.

For Business Support organisations (Clusters, Associations etc.):

- ☐ Facilitate Strategic Matchmaking: move beyond general networking to organize focused B2B matchmaking events in high-potential sectors (Industry 4.0, Cybersecurity, AgriTech). Crucially, matchmaking should not be limited to ICT-to-ICT connections, but aim to connect traditional sectors in need of digitalisation with ICT companies, fostering cross-sectoral collaborations and investments. The EDIH network provides a strong starting point for implementing such activities.
- ☐ Develop Joint R&D and Innovation Platforms: launch collaborative platforms for co-development in areas of mutual interest, such as green tech and defence tech, leveraging Horizon Europe and Digital Europe Programme funding.

For Businesses:

- ☐ Form Strategic Partnerships, Not Just Subcontracts: EU firms should engage Ukrainian companies as co-development partners in complex projects to leverage their full innovation potential.
- ☐ Co-invest in Ukraine's Industrial Modernization: EU industrial and tech firms should explore joint ventures to implement Industry 4.0/5.0 solutions in Ukraine, addressing a critical dependency for Ukraine and creating a resilient, near-shore supply chain for the EU.

1.3. Next Steps

The immediate next steps will focus on translating strategic insights into concrete actions that strengthen cooperation and competitiveness across the EU-Ukraine digital ecosystem:

1. **Capacity Building**
   Facilitate building capacities of Ukrainian clusters and SMEs on EU market entry, regulatory compliance (e.g., GDPR, AI Act), and access to EU funding instruments through mapping and promoting available free-of-charge instruments as well as organising high-quality targeted trainings. These initiatives will enhance managerial and technical capacity, enabling Ukrainian organisations to integrate more effectively into European value chains.
2. **Strategic Matchmaking**
   Organise business missions and B2B matchmaking events centred around the "Golden Triangle" sectors: digital, green, and defence technologies. These activities will foster tangible partnerships, promote cross-border cooperation, and stimulate innovation-led trade between Ukrainian and EU companies.
3. **Policy Dialogue**
   Share the findings and recommendations of this report with EU and Ukrainian policymakers to support evidence-based decision-making. Strengthening dialogue between public authorities, clusters, and business support organisations will be crucial for removing regulatory barriers, aligning innovation policies, and accelerating digital transformation.

Together, these actions aim to create a sustainable foundation for Ukraine's deeper integration into the EU Single Market and to unlock the shared potential of both ecosystems.

2. INTRODUCTION AND PURPOSE OF THE STUDY

2.1. Background of the Study

The ITBridge project is a cooperation initiative linking Ukrainian and EU IT clusters, established under Grant Agreement 101196018-ITBridge-SMP-COSME-2024-CLUSTERUA-01. Ukrainian partners include the Kharkiv IT Cluster, Dnipro IT Community, and Odesa IT Family, while European partners are the Transilvania IT Cluster and Cluster Digital de Catalunya. **The project aims to improve cluster efficiency in supporting the green and digital transition and to integrate Ukrainian IT companies into established EU digital value chains.** Its focus is on long-term integration rather than temporary post-war recovery.

A key component of the project is a strategic analytical report covering the Ukrainian and EU digital sectors. This report provides data and insights to support decision-making, guide sustainable partnerships, and inform the implementation of project roadmaps.

EU Digital Sector: Overview

The EU digital sector is a major economic force, demonstrating strong growth and digital adoption [1].

- **Economic Contribution:** 4.4% of the EU's GDP (approx. €1.2 trillion).
- **Workforce:** Over 10 million people (5% of total employment).
- **Growth Rate:** Strong annual growth of 10-12%.
- **Digital Intensity:** 75% of EU enterprises have achieved at least a basic level.
- **Technology Adoption:** 45% use cloud services, 29% use big data analytics, and 14% integrate AI.
- **2030 Targets:** The EU aims for over 90% of SMEs to reach basic digital intensity and for 75% of companies to use cloud, big data, or AI.

Ukrainian Digital Sector: Overview

Ukraine's IT sector has shown remarkable resilience and innovation, positioning itself as a key player in the global market [2], [3].

- ***In 2024,*** *the IT sector provided* ***$6.8 billion*** *in services exports, which was* ***$37.7%*** *of Ukraine's total services exports.*
- *The number of individual entrepreneurs in the sector* ***increased*** *from 296,979 in 2022* ***to 328,256*** *at the beginning of 2025.*
- ***189*** *accredited universities graduate over* ***20,000 IT specialists annually.***
- ***In 2025,*** *the Classification of Professions was updated, including* ***29 new professional titles specifically for the IT sector*** *(e.g., AI Engineers).*
- ***2030 Targets:*** *Driven by the Ministry of Digital Transformation, Ukraine is positioning itself as a European digital powerhouse and aims to become the most digital-friendly nation in the world by 2030.*

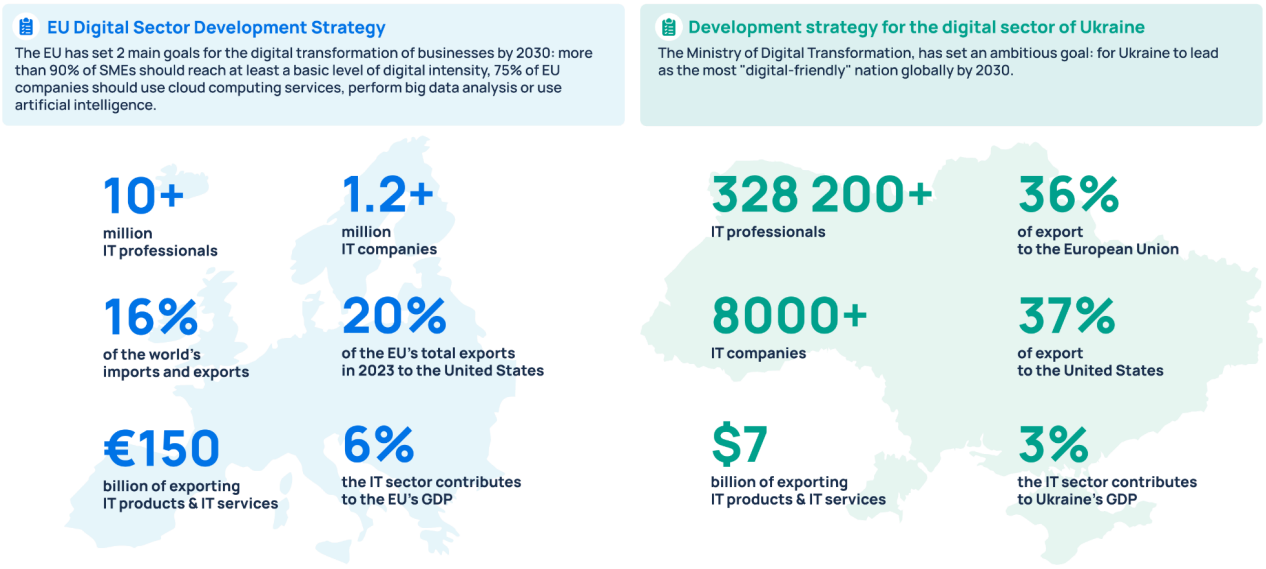

Figure 1: A comparative infographic of the EU and Ukrainian digital sectors, highlighting key metrics such as size, workforce, and strategic targets.

IT Cluster Ecosystem of Ukraine and EU: Overview

IT clusters drive digital transformation, competitiveness, and partnerships in Ukraine and the EU.

- **Ukraine:** Features five main IT hubs in Kyiv, Kharkiv, Lviv, Dnipro and Odesa. **36 clusters** from Ukraine were registered on the European Cluster Cooperation Platform (ECCP) covering **22 regions** of Ukraine in presence. The Ukrainian Cluster Alliance (UCA) coordinates national cluster activity.
- **EU:** Hosts over 1,000 clusters registered on the European Cluster Collaboration Platform, with approximately 20% dedicated to IT and digital technologies. These clusters are pivotal in driving innovation in AI, cybersecurity, and cloud computing.

By leveraging established cluster networks in both Ukraine and the EU, **the "ITBridge" project provides a practical and resilient framework for EU-Ukraine cooperation in the digital sector.**

2.2. Objectives of the Study

The “EU-Ukraine Digital Sector Interlinkages Report” has four main objectives aimed at strengthening EU-Ukraine digital collaboration:

1. **Map the digital landscape** by analysing the Ukrainian IT sector’s size, structure, key players, and integration with EU markets, including major IT clusters, companies, and emerging technology initiatives.
2. **Define value chains and collaboration opportunities,** identifying where and how Ukrainian and EU companies can work together in high-potential digital segments and leverage complementary capabilities for joint innovation.
3. **Identify barriers and policy gaps,** examining regulatory, economic, and geopolitical obstacles to cross-border cooperation and providing actionable recommendations for policymakers and stakeholders.
4. **Explore future trends and scenarios** through foresight analysis, generating insights to inform strategic planning and align policies between the EU and Ukraine.

These objectives are closely connected with the ITBridge project’s focus on key strategic priorities of both the EU and Ukraine.

- **For the EU,** the project supports the New Industrial Strategy [4] and the European Digital Strategy [5] by boosting competitiveness, innovation, and resilience [6]. ITBridge integrates Ukrainian IT companies into EU value chains, bringing new talent, solutions, and opportunities for growth and jobs. It also strengthens resilience by diversifying the digital ecosystem. Ukrainian expertise in software development and cybersecurity helps the EU adopt advanced digital technologies faster.
- **For Ukraine**, the project facilitates economic recovery and deeper integration into European markets, aligning with Ukraine's National Recovery Plan [7] and the Ministry of Digital Transformation's integration roadmap [8]. It enables companies and clusters to adopt European practices, build sustainable partnerships, and expand their presence in the EU.

By mapping the digital landscape, defining value chains, identifying barriers, and anticipating future trends, the report provides essential data and insights to guide the ITBridge project activities such as capacity building and matchmaking, ensuring they are effective and targeted. The established networks and partnerships ensure results last beyond the project and create a model that can be expanded to other countries.

The ITBridge project's impacts are expected across three key target groups:

	Short-term (Year 1)	Medium-term (Years 2-3)	Long-term (Years 3+)
Policy Makers	**Received practical insights** from market and foresight studies **to guide decisions**	**Regular engagement ensures** policies **match industry needs** and support **digital growth**	Implemented strategies that **strengthen EU-Ukraine digital integration, improved competitiveness** and **grow the digital economy**
EU and Ukrainian IT Companies	Increased awareness of **collaboration opportunities and access to the market**	Build **strategies for entering EU markets**; start **partnerships and contracts**	**Grown sustainably in the EU;** developed new products, services, and business models that address shared challenges
EU and Ukrainian IT Clusters	Improved cluster management capacities and **established new partnerships**	Expanded **collaboration and integration** into the EU digital ecosystem	EU and Ukrainian clusters recognized as **sustainable actors in the European digital landscape**, with demonstrated capacity to support SMEs and drive innovation

Figure 2: Project impact for each target group

2.3. Methodology of the study

The methodology of the study was designed to be rigorous, data-driven, and validated by industry experts to ensure the strategic relevance and accuracy of its findings. The study employs a mixed-methods approach, integrating the following steps.

STEP1: Desk Research

A comprehensive review of available analytics and open sources was conducted to establish a baseline understanding of the market, policy, and innovation landscapes. This included:

- Official reports from the European Commission, Eurostat, and Ukrainian government bodies (e.g., Ministry of Digital Transformation, Ministry of Economy).
- Market analysis and investment reports from industry associations (e.g., IT Ukraine Association, TechUkraine) and consulting firms.
- Academic studies and foresight reports on technological trends and geopolitical factors.

STEP 2: Focus Groups

Two structured, 120-minute focus groups were conducted using the "World Café" method to gather in-depth qualitative insights from key stakeholders:

- **Ukrainian Focus Group:** Composed of executives, founders, and representatives from Ukrainian IT companies, clusters, and business support organisations.
- **European Focus Group:** Included representatives from IT and industry clusters, business support organisations,and company executives from 10 EU member states.

Discussions were designed to validate desk research, identify nuanced challenges, and build consensus on market strengths and weaknesses.

STEP 3: Surveys and Expert Consultations

Two targeted online surveys were launched to supplement findings collected during the focus groups.

- **Ukrainian Survey:** Focused on identifying Ukraine's dependencies on non-EU digital solutions.
- **European Survey:** Assessed EU industries' needs and their interest in collaborating with Ukraine.

The survey data was supplemented by 1-1 consultations with subject-matter experts to refine and validate the findings.

STEP 4: Foresight Study

A 2x2 scenario analysis framework was used to explore the future of EU-Ukraine digital cooperation over a 5-10-year horizon. This method maps potential outcomes based on two critical uncertainties:

- Level of Ukraine-EU Political and Institutional Integration (from low to high).
- Speed of Technological Transformation and Adoption (from slow to fast).

Four distinct scenarios were developed and discussed in the frame of a collaborative international expert workshop, and participants voted to identify the most desirable and the most likely (inertial) outcomes.

This sequence of steps moves from factual baselines to validated stakeholder insight and quantified evidence. Using several sources and methods means we don't rely on any single view, so the results are stronger and easy to verify. The scenarios then turn the evidence into clear, practical takeaways – what could go right or wrong, and which levers policymakers and businesses can pull.

3. DIGITAL MARKET LANDSCAPE

3.1. Overview of Ukraine's Digital Sector

3.1.1. Ukrainian IT Market Overview

The Ukrainian tech sector continues to demonstrate remarkable resilience and growth, despite ongoing external challenges. The IT industry has **successfully preserved its large talent pool**, with the total headcount growing modestly since 2022. The most significant structural shift is the **rapid emergence and formalization of the Gig specialist segment** (a special employment model introduced by the Diia City legal and tax regime), indicating a substantial move towards more flexible and project-based employment models within the sector.

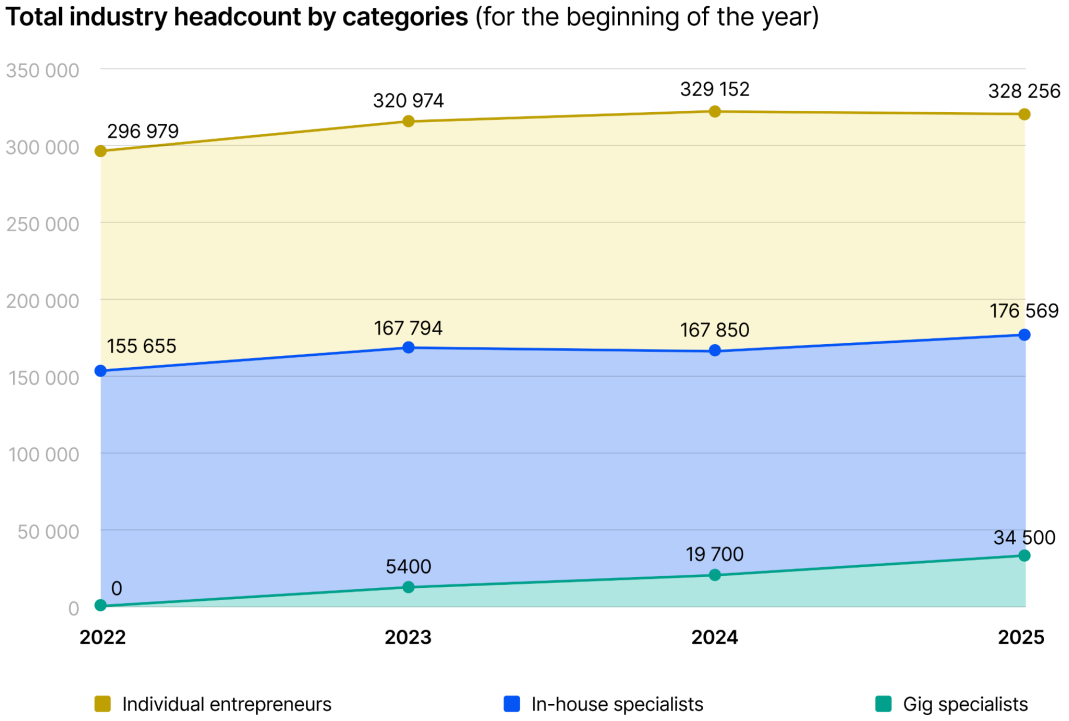

*Figure 3: Total Ukrainian industry headcount by categories**
*(based on raw data by YCMarket [9], study data disclaimer is Appendix 1)**

The category totals for Individual entrepreneurs, In-house specialists, and Gig specialists are not mutually exclusive; therefore, the sum of these categories does not represent the total unique industry headcount. This is due to the possibility of specialists concurrently operating under more than one employment status.

The market structure analysis from 2022 to 2025 demonstrates a marked and continuous concentration on the sector's core competency. **Software development** is the unequivocally dominant category, indicating that outsourcing and custom software creation remain the central pillar of the Ukrainian IT industry.

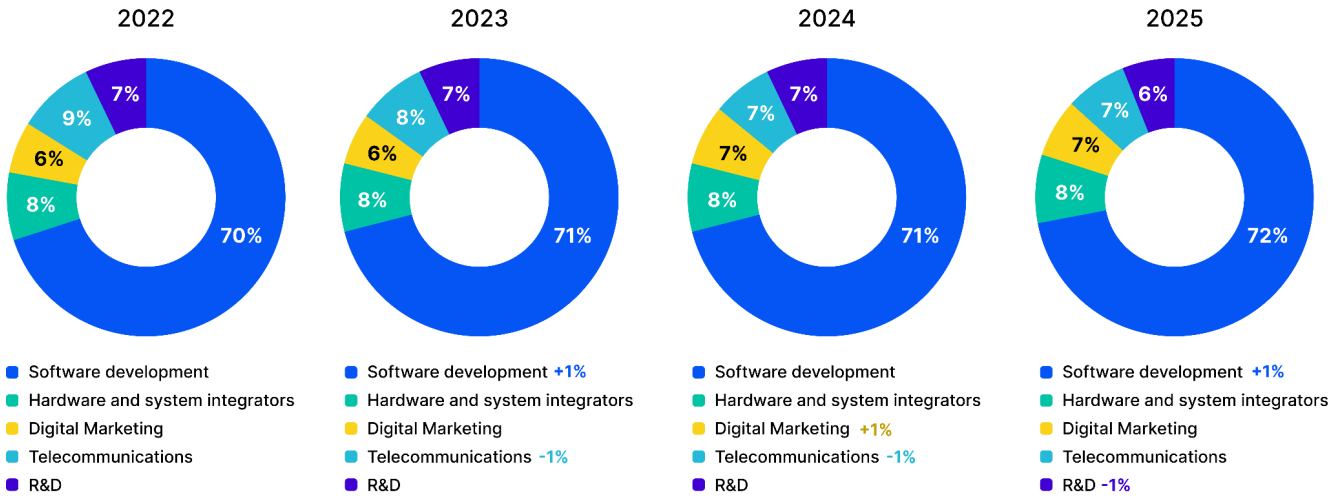

*Figure 4: Ukrainian industry by directions *(based on raw data by YCMarket [9], study data disclaimer is Appendix 1)**

3.1.2. Ukraine's Regional IT Hubs

The national innovation economy is underpinned by a diverse network of regional hubs, where statistical performance can be categorized into key segments.

The three largest IT hubs — **Kyiv, Kharkiv and Lviv** — together account for **50% of the sector's performance**. The next significant segment, comprising **30%**, is spearheaded by **Dnipro and Odesa** (study data disclaimer is Appendix 1). Following this leading duo, the contribution of **seven major regions**, depictured on the diagram, is also included in this segment. This segmented statistical breakdown highlights the broad geographical foundation of Ukraine's technological strength.

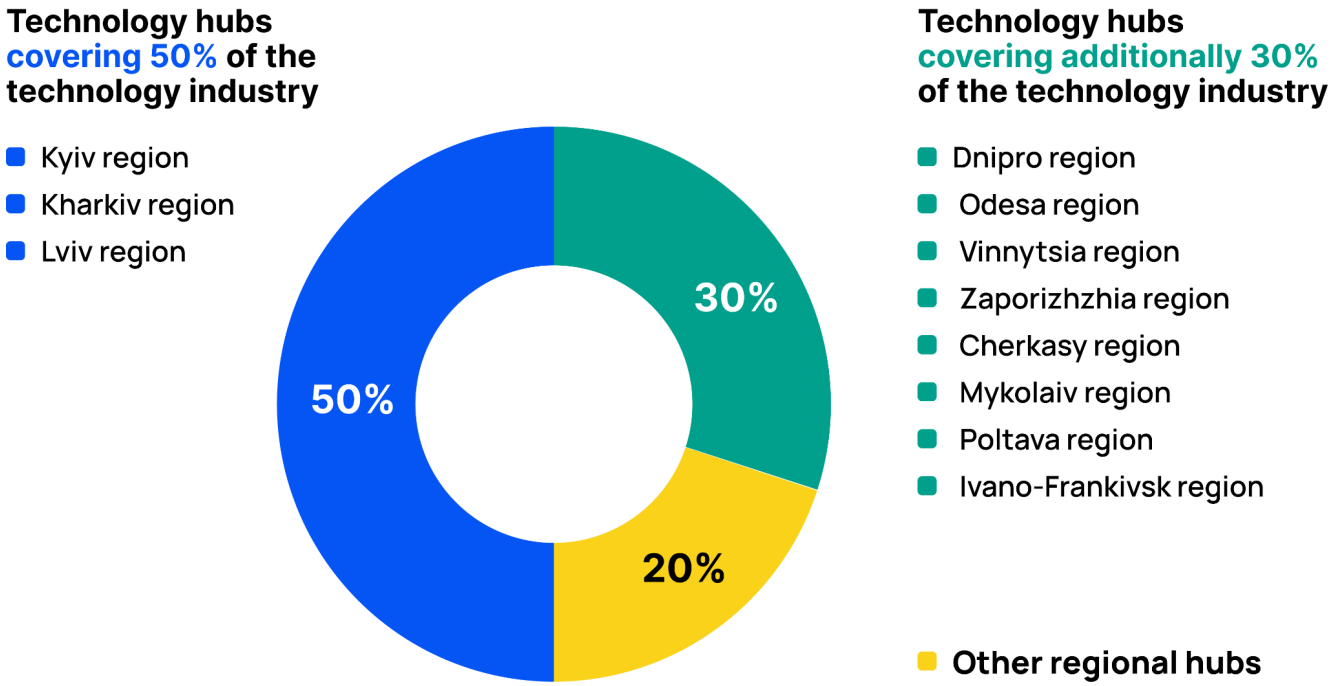

Figure 5: Ukraine's Regional IT Hubs (based on raw data of the major headcount group - quantity of individual entrepreneurs due to 30.09.2025 data by YCMarket [9])

The **cluster movement** plays a key role in Hubs localisation, followed by a priority in the **National Economic Strategy 2030 and the National Regional Development Strategy 2021–2027**.

The Ukrainian Cluster Alliance (UCA), founded on the initiative of stakeholders, is an association that mobilises the community. As of mid-June 2024, **36 clusters from Ukraine** were registered on the European Cluster Cooperation Platform (ECCP) and according to the UCluster, more than **22 regions** of Ukraine have active IT clusters [10].

Among the organisations being reported with significant achievements and successful cases *Kharkiv IT Cluster* (European Cluster Excellence BRONZE Label), *Lviv IT Cluster, Association of Industrial Automation Enterprises of Ukraine (APPAU), Ukrainian Association of Startups, Ukrainian Industrial Cluster, Innovation Cluster RinnoHub, Vinnytsia Automation* and *Instrument Making Cluster* stand out, being followed by *Dnipro IT Community* and *Odesa IT Family* performing as runner-ups.

Together, the **hubs sustain Ukraine's IT sector, drive economic growth, and strengthen integration with the European digital market.** As Ukraine deepens its integration with the European digital market, the maturity of these tech centres underline the country's readiness to contribute meaningfully to Europe's technological future.

3.1.3. Key Segments

Ukrainian IT companies have strong expertise across Retail & E-commerce, Healthcare & Pharmaceuticals, Education & Training, and Hospitality & Tourism, while also developing solutions in strategically important areas such as DefenceTech, MilTech, FinTech, AgriTech, EnergyTech, GovTech, and CyberTech. This diversity shows the sector's ability to deliver innovative solutions for the economy, healthcare, education, security, and sustainable development. (More details on these areas and their role in EU-Ukraine value chain integration can be found in Section 5).

As of 2024-2025, the leading segments remain FinTech, Retail & E-commerce, business productivity software, and HealthTech [2]. However, Ukraine's Innovation Vision 2030 [11] sets a strategic shift:

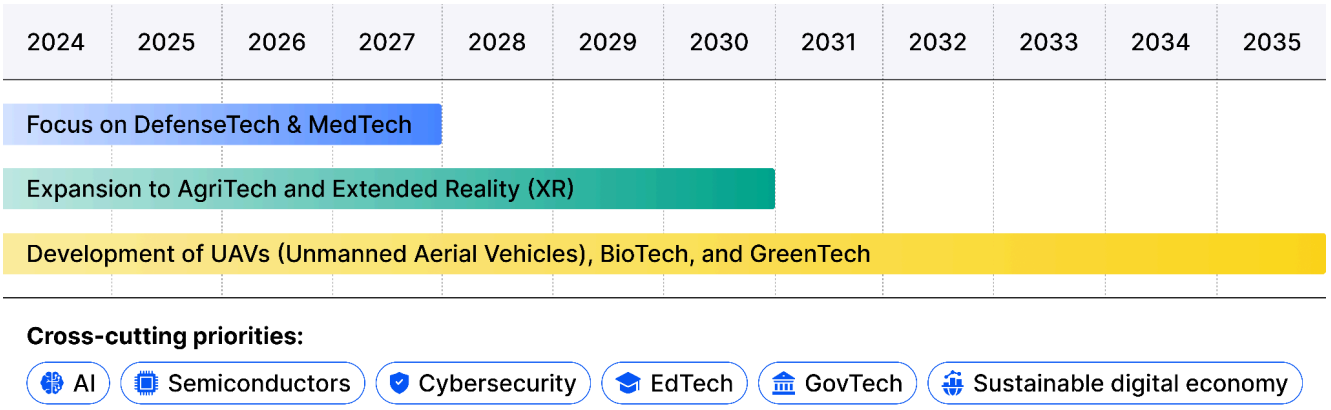

Figure 6: Strategic roadmap for key technology priorities of Ukraine, 2024-2035

This roadmap highlights a move from service delivery and market-driven solutions toward **technological sovereignty, sustainability, and global competitiveness.** It positions Ukraine not only as a service provider but as a strategic partner in deep-tech innovation and long-term EU-Ukraine digital integration.

3.1.4. Workforce Dynamics of the Ukrainian IT Industry

Ukraine maintains a strong IT talent pipeline that supports long-term industry resilience. In 2025, 189 accredited universities and higher education institutions [12] produce over 20,000 IT graduates annually.

First-year enrollment in IT programmes in 2024 included 12,000 budget-funded and 12,000 contract students. The most popular majors were Computer Science (6,711), Software Engineering (5,003), Cybersecurity (3,358), Computer Engineering (2,412), and Automation (2,099) [13].

In 2025, the Ministry of Economy of Ukraine updated the Classifier of Professions to include 42 new professional job titles, with 29 specifically in the IT sector, to align with global standards and current market needs. These include titles such as AI Engineers and Software Development Specialists, reflecting market demand and technological trends [14], [15]. This ensures alignment between education and industry needs, supporting more specialized, product-focused work and mitigating brain drain.

3.1.5. Ukrainian IT Exports and Import Dynamics

Export

Ukraine's IT sector remains a **strategic driver of the economy**, accounting for 37.7% of all services exports in 2024. The industry demonstrates stable export potential, flexibility, and competitiveness in global markets, highlighting the high quality of Ukrainian specialists [16]. Despite external challengesIT exports **continue to show resilience**.

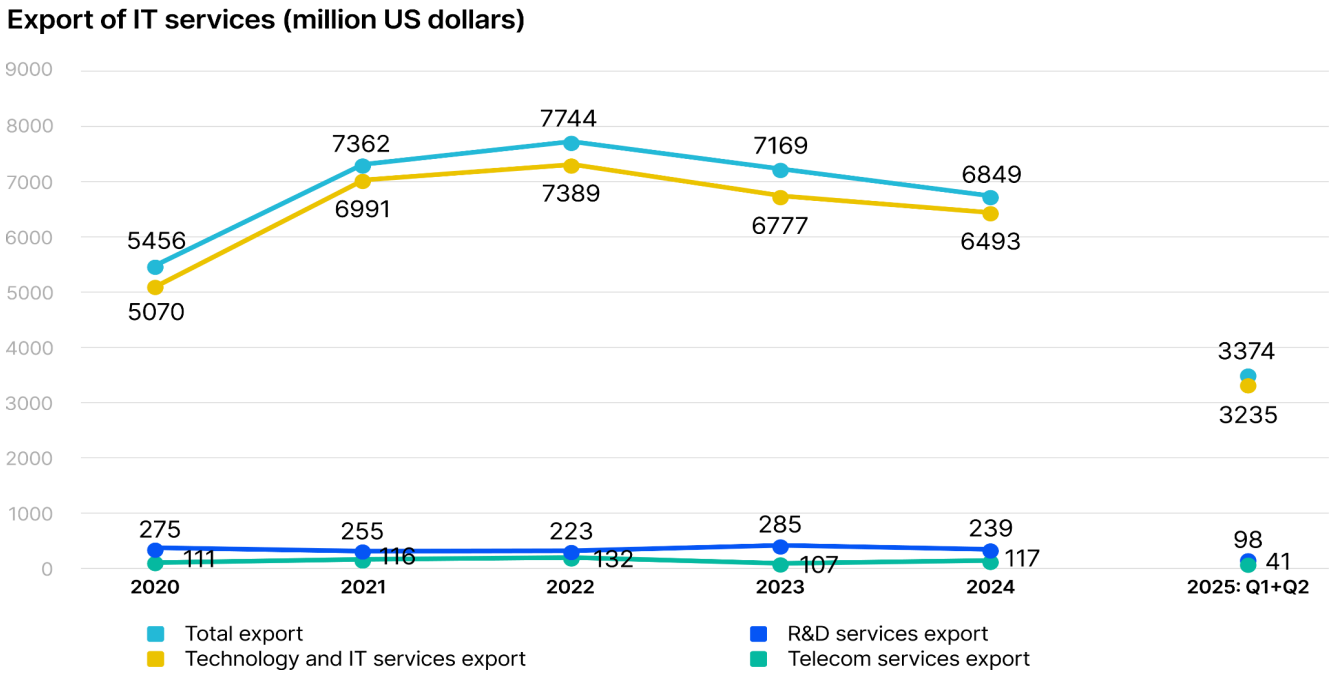

Figure 7: Ukrainian export dynamics 2020-2025 (NBU [17] raw data)

Ukrainian IT companies are highly internationalized: 93% of firms sell their services abroad. The United States is the largest importer, accounting for $2.397 billion (37.2%) of total IT exports in 2024. The United Kingdom follows with $565 million (8.8%), and Malta with $501 million (7.8%). Other growing markets include Cyprus ($394 million, 6.1%), Israel ($297 million, 4.6%), Switzerland ($266 million, 4.1%), Germany ($263 million, 4.1%), Canada ($166 million, 2.6%), the Netherlands ($166 million, 2.6%), and Sweden ($138 million, 2.1%). This diversification underlines the sector's sustainability and potential for further global integration [2].

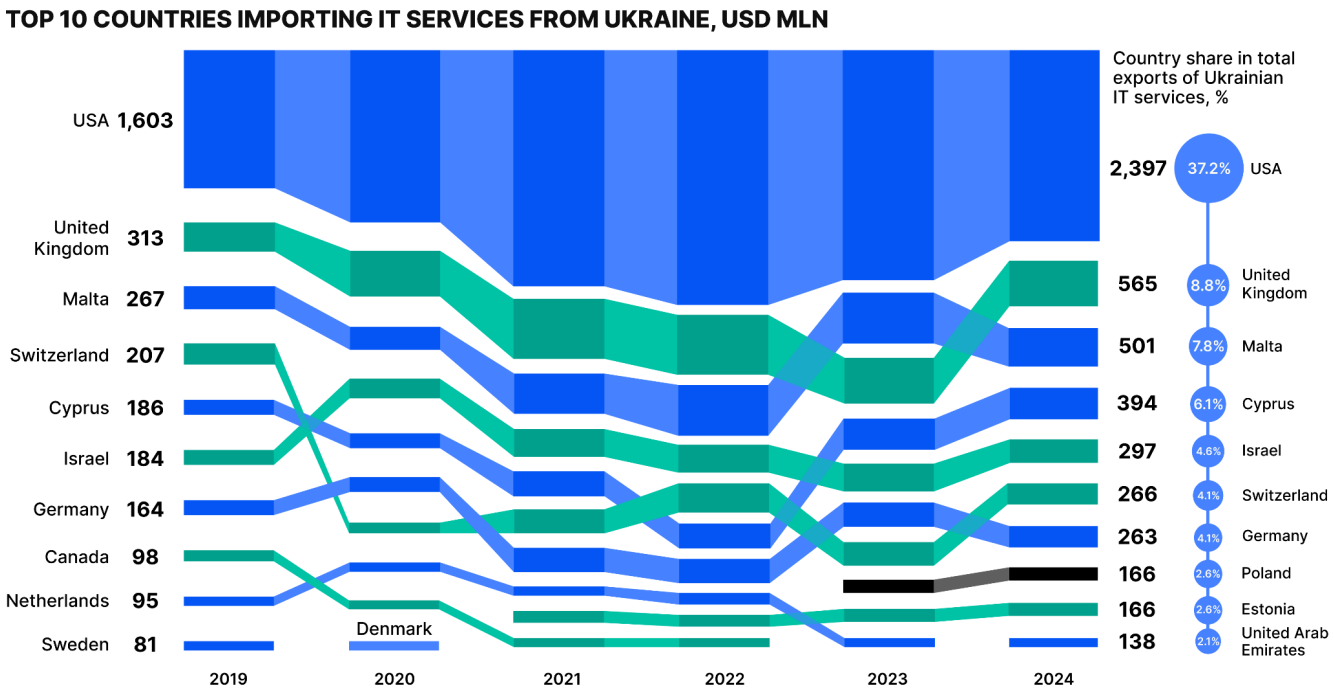

Figure 8: TOP 10 countries importing IT services from Ukraine

Import

In contrast to exports, the **import of IT services has shown strong growth**. This upward trend reflects an **internal demand** for foreign technology, including specialized software, cloud infrastructure, and security services. Ukrainian businesses and government agencies are prioritizing **digital resilience and modernization**, necessitating increased spending on foreign IT solutions to maintain operations and security under wartime conditions. Still, the IT sector still maintains a massive **positive trade balance** (it earns far more than it spends).

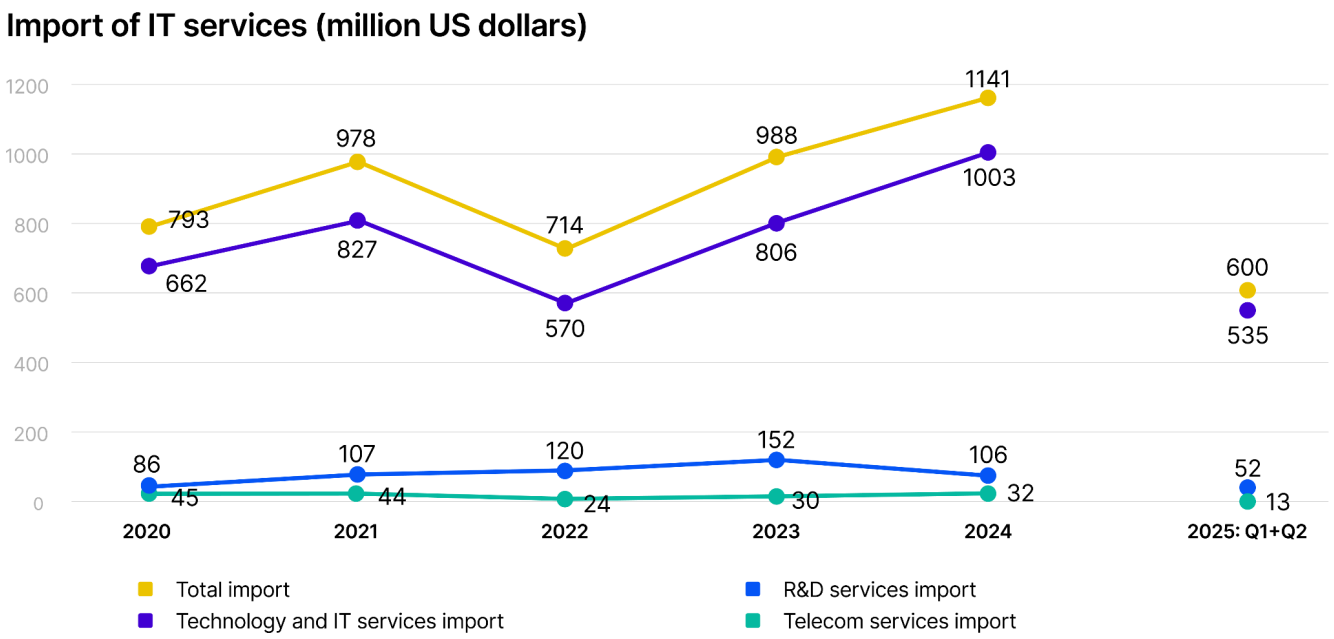

Figure 9: Ukrainian import dynamics 2020-2025 (NBU [17] raw data)

3.1.6. Investment Recovery and Capital Dynamics

The Ukrainian tech investment landscape has rebounded strongly after the contraction caused by the 2022 invasion. From $236 million in 2022 and $209 million in 2023, **total investments surged to $462 million in 2024**, recovering over half of the 2021 peak of $832 million. M&A activity remains robust, with 25 deals worth $510 million concluded in H1 2024. Foreign investors continue to dominate, and Ukrainian companies like Ciklum and Intellias are expanding internationally, reflecting growing global integration.

Investment Breakdown 2024:

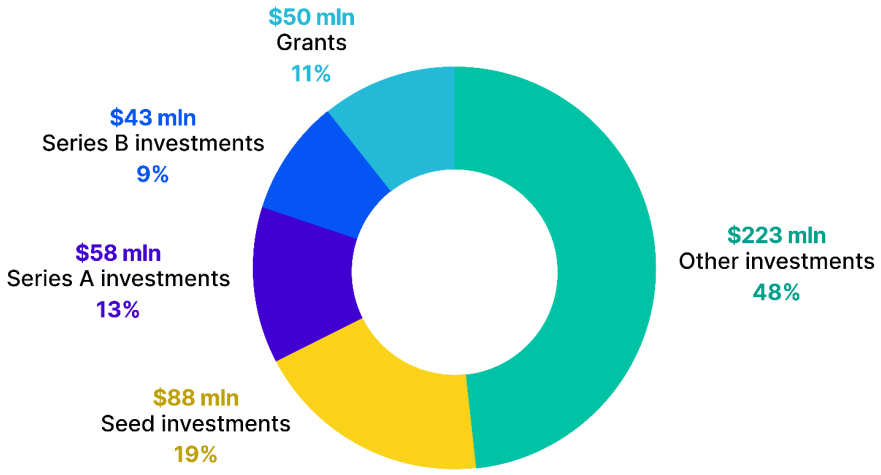

Figure 10: Ukraine's Tech Sector Investment Breakdown 2024

Defence Tech and Emerging Sectors

The defence tech sector is rapidly growing, attracting specialized VC funds, acceleration programmes, and new startups. In 2024, estimated defence **investments reached $59 million** (equity $18 million + grants $41 million), with companies like Osavul, Swarmer, and Bavovna.AI leading funding rounds.

Ukraine's tech sector is resilient, globally competitive, and increasingly integrated with European markets. Despite geopolitical challenges, investment recovery, growing export diversification, and emerging sectors like defence tech position the country for continued expansion and international collaboration. **The combination of mature startups, global partnerships, and supportive policies ensures Ukraine remains a key player in the European ecosystem** [2], [18].

3.1.7. Diia.City: Opportunities for Collaboration and EU Integration

Diia.City is a virtual free economic zone that creates favorable conditions for Ukrainian IT companies to grow, attract investment, and expand into international markets. With competitive tax rates, flexible employment and entrepreneurship options, and integrated common law instruments like convertible loans, options, and ESOPs, **Diia.City provides transparency and investor confidence, making Ukrainian tech companies attractive partners for European collaboration.**

The fiscal impact of Diia.City has been significant, with tax revenues rising from $126.8 million in 2022 to $232.4 million in 2023 and an estimated $448.3 million in 2024. Resident companies benefit from simplified corporate structures and preferential fiscal conditions, including low personal and corporate taxes and investment deductions, which enhance the potential for cross-border projects and joint ventures. **About 70% of Ukrainian IT companies are now Diia.City residents**, including major international actors (e.g., Visa, Samsung, Rakuten Viber, Stellantis, SAP, Nokia), are demonstrating broad adoption and readiness for partnership with EU counterparts.

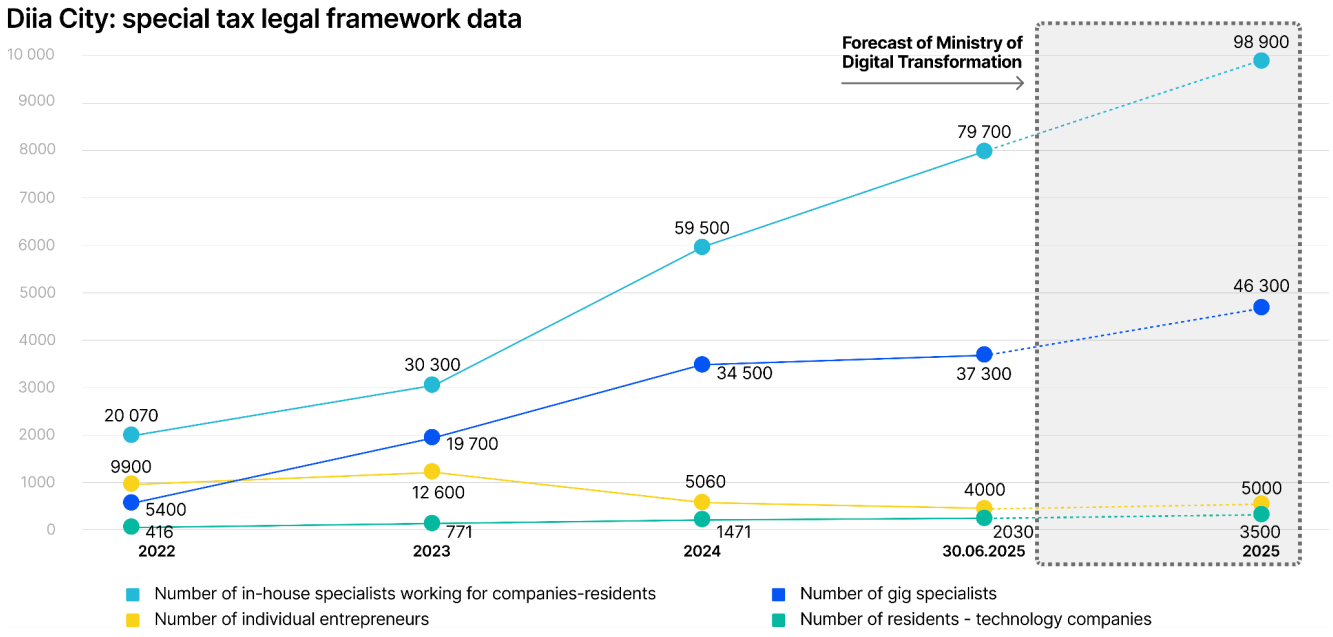

Figure 11: Diia City: end of year residents data (by Ministry of Digital Transformation [8])

By aligning legal, financial, and operational frameworks with international standards, **Diia.City supports seamless cooperation with European companies, venture capital funds, and research projects.** Its ecosystem facilitates integration into EU value chains, strengthens innovation networks, and positions Ukrainian IT firms as reliable partners for sustainable growth and technology development [2], [8], [19].

3.2. Overview of EU Digital Markets

The European Union is one of the world's most dynamic digital markets, shaped by strong policies, major investments, and a rapidly evolving technology ecosystem. The IT sector already accounts for over 5% of EU value added, with nearly 10 million professionals employed, making digital technologies and skills a central driver of competitiveness [20].

Through initiatives such as the Digital Decade 2030 targets [21], the Digital Europe Programme [22], Horizon Europe [23], and the Recovery and Resilience Facility [24], the EU is investing heavily in innovation, infrastructure, and emerging technologies. In parallel, the European Digital Innovation Hubs (EDIH) Network – a community of tech experts that work throughout all EU regions – is the driving force behind Europe's digitalisation. More than €200 billion has been committed to supporting digital transformation, including large-scale funding for artificial intelligence, cybersecurity, cloud computing, high-performance computing, and advanced connectivity. These measures underline Europe's ambition to secure digital sovereignty, strengthen competitiveness, and integrate the green and digital transitions.

At the same time, challenges remain. Digital skills are unevenly distributed, with only around half of citizens possessing basic digital literacy, far from the 2030 target of 80%. Regional disparities in infrastructure and unequal investment flows across member states also slow down progress. Addressing these barriers is key to ensuring inclusive participation in the digital economy.

For Ukraine, these dynamics open significant opportunities for cooperation with the EU. Ukrainian companies can offer talent, expertise, and innovative solutions that align with EU priorities while benefiting from Europe's robust digital ecosystem and investment flows. Collaborating in priority areas of the EU's digital agenda can deepen integration, strengthen cross-border partnerships, and create joint growth opportunities in global markets.

The following outlines key sectors driving this transformation:

- **Digital platforms:** Central to consumer and business interaction, with e-commerce sales projected to reach €900 billion by 2028. Platforms also play a growing role in labor markets, with platform-based work involving around 3% of the EU workforce.
- **Cloud computing:** Generating €185 billion in revenue in 2024, with strong growth in Software as a Service and Infrastructure as a Service, particularly in advanced markets such as France and Germany.
- **Artificial intelligence (AI):** Adoption is accelerating, with 13.5% of enterprises already using AI in 2024, up from 8% in 2023. Large enterprises and IT-intensive sectors are leading adoption.
- **Digital transformation services:** Valued at €317 billion in 2024, projected to exceed €2.9 trillion by 2033, as businesses in manufacturing, healthcare, and other industries integrate digital solutions.
- **Cybersecurity:** A critical growth area, with the market valued at €35.4 billion in 2024 and expected to reach €57.7 billion by 2029, driven by GDPR and NIS2 compliance.
- **FinTech:** A major innovation driver in banking, payments, and blockchain, valued at €120 billion in 2024 and projected to grow to €200 billion by 2029.
- **Internet of Things (IoT):** Expanding across smart cities, healthcare, manufacturing, and logistics, with the EU market doubling from €50 billion in 2024 to €100 billion by 2029.
- **Telecommunications and connectivity:** Worth €300 billion in 2024, expected to grow to €350 billion by 2029, with 5G rollout enabling new industrial and consumer applications.
- **Digital content and creative industries:** Streaming, gaming, and media services reached €50 billion in 2024 and are projected to grow to €80 billion by 2029, fueled by demand for interactive experiences.

Together, these sectors illustrate the EU's dynamic and diverse digital economy. **For Ukraine, they represent key entry points for cooperation**, where talent, innovation, and cross-border collaboration can accelerate mutual growth and integration into the European digital ecosystem.

3.2.1. Relevant Countries and Regions

The EU digital market is diverse, with performance varying significantly across member states and regions.

Leading Digital Regions in the EU

Certain EU member states consistently lead in digital development, combining strong infrastructure, high digital skills, robust IT employment, and widespread adoption of advanced technologies. According to the State of the Digital Decade 2025 [25] and the European Innovation Scoreboard 2025 [26], **the top performers are the Netherlands, Finland, Germany, Sweden, and Denmark.** These countries represent potential partners for collaboration with Ukraine in the digital sector.

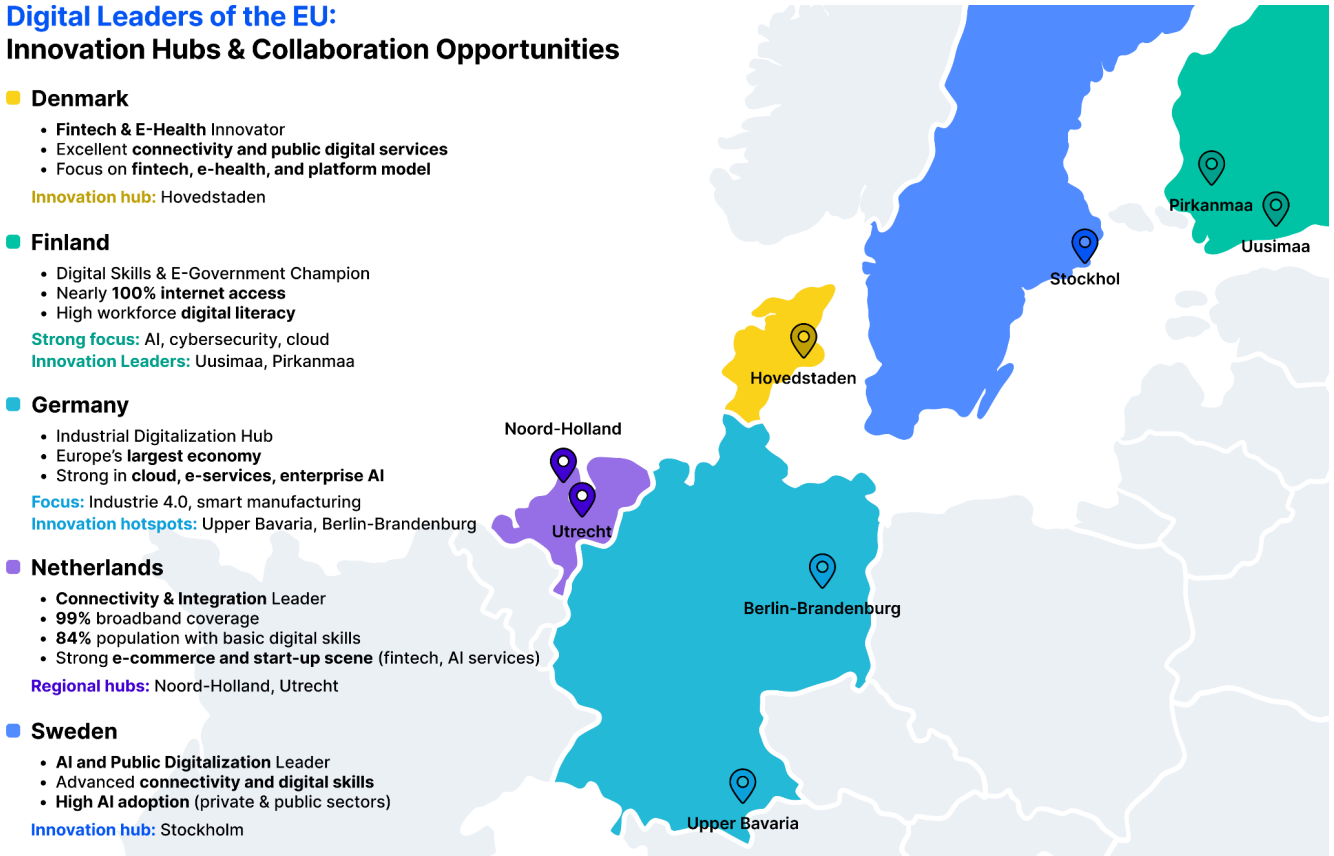

Figure 12: Leading Digital Regions in the EU

These leading economies share well-developed digital infrastructure, significant investment in IT education, high density of IT specialists, and supportive policies for innovation. **Their advanced regional ecosystems create opportunities for Ukraine** to engage in collaborative digital projects, share expertise, and integrate Ukrainian IT capabilities into broader EU technology networks.

Emerging Digital Regions in the EU

While the EU has clear frontrunners in digital development, several regions are rapidly emerging as hubs of digital growth and innovation. **These emerging digital economies are: Spain, Italy, Portugal, Eastern Europe, and the Baltics** — leverage improving infrastructure, growing digital skills, and targeted policy support to strengthen their integration into the broader digital economy. Innovation potential is often

concentrated in specific sub-regions, creating opportunities for collaboration with Ukrainian IT companies, joint projects, and knowledge exchange.

Figure 13: Emerging Digital Regions in the EU

These emerging digital regions demonstrate high innovation potential and growing capabilities, **offering opportunities for Ukraine** to expand digital cooperation, integrate into EU technology networks, and participate in joint projects that strengthen regional digital ecosystems.

Connecting Ukraine to Europe's Digital Economy

Despite overall progress in digital development, significant disparities persist both between and within EU member states. Leading digital economies, such as the Netherlands, Finland, Germany, Sweden, and Denmark, benefit from advanced digital infrastructure, high levels of digital skills, robust IT employment, and widespread adoption of cutting-edge technologies. **These countries offer Ukrainian IT companies access to mature ecosystems, opportunities for joint R&D, cross-border projects, and knowledge exchange in AI, cloud computing, cybersecurity, and digital transformation.**

Several countries in Southern and Eastern Europe, including Spain, Italy, Portugal, Romania, Bulgaria, and the Baltic states, are rapidly emerging as hubs of digital growth. Targeted policy support, improving infrastructure, and growing digital skills in regions such as Madrid, Catalonia, Lombardy, Emilia-Romagna, Lisbon, Porto, Vilnius, Cluj-Napoca, and Mazovia create new avenues for collaboration. **Ukrainian IT companies can integrate into these markets by providing services, participating in joint ventures, and contributing to innovation initiatives,** while also benefiting from EU programmes and investments supporting digital ecosystems.

Even within highly advanced member states, digital uptake is uneven. Urban hubs typically have superior connectivity, higher digital skills, and a greater concentration of start-ups and innovation clusters, while rural and peripheral areas often adopt digital services more slowly. Broadband coverage and high-speed internet penetration in rural regions of Germany, Italy, and other countries remain below national averages, highlighting infrastructure gaps. **Ukrainian IT firms can support digital projects, provide software solutions, and participate in skills development programmes to help bridge these gaps.**

Economic and Policy Implications

Regional disparities in digital infrastructure, skills, and innovation create a complex environment for EU investors and policymakers. Urban hubs with strong connectivity and innovation clusters offer immediate opportunities, while rural and peripheral areas hold untapped potential requiring targeted investment.

Effective policies must go beyond national averages. Place-based strategies, expanding high-speed networks, improving digital literacy, and supporting local innovation are key to inclusive growth. Achieving the EU Digital Decade 2030 goals requires about €148 billion for gigabit and 5G coverage, with total public funding likely exceeding €174-200 billion. Mobilizing private capital through public–private partnerships and blended finance will be essential [27].

The EU Cohesion Policy helps reduce territorial disparities, allocating €378 billion in 2021-2027 for economic, social, and territorial convergence, including €13.5 billion for digital connectivity and €34 billion for regional innovation. Complementary instruments, such as the Digital Decade Policy Programme 2030, Cohesion Fund, and Recovery and Resilience Facility, promote connectivity, digital skills, and innovation in less-developed regions.

For Ukraine, these dynamics open opportunities for collaboration. Alignment with EU digital priorities enables Ukrainian IT companies to join cross-border projects, deliver digital services, and integrate into European innovation networks, strengthening both EU regional development and Ukraine's integration into the European digital market.

3.2.2. Market Dynamics and Potential

Europe's digital markets are evolving rapidly, shaped by rising demand, industry consolidation, and a maturing regulatory framework that sets clear, if demanding, rules.

- **Demand side:** Enterprise adoption of digital technologies is accelerating. By 2023, 45% of EU firms (10+ employees) used cloud services, up 4.2 points from 2021, and AI adoption reached 13.5% in 2024 (8% in 2023), led by large firms in ICT sectors. Consumer engagement remains strong: 23.8% of enterprises sold online in 2023, with e-commerce reaching 19.1% of total turnover [28], [29].
- **Supply side:** Europe's digital market is large but unevenly contested, especially in cloud infrastructure. Revenues reached the mid-tens of billions of euros in 2024-2025, yet US hyperscalers dominate, while European providers' market share has declined despite growth [30]. This concentration increases pressure but also strengthens the case for EU-compliant, trusted cloud offerings.
- **Regulation:** The EU's regulatory wave defines its market environment. The Digital Services Act [31] and Digital Markets Act [32] became fully applicable in early 2024; the AI Act [33] entered into force in August 2024 with phased implementation to 2026; the Data Act [34] followed in September 2025, expanding data access rights; and the NIS2 Directive [35] tightened cybersecurity rules from October 2024. These frameworks raise compliance costs but also open transparent, rules-based opportunities for compliant providers.
- **Infrastructure and financing:** Connectivity continues to improve; by 2023, over 90% of EU households have internet access, and 5G/gigabit rollouts are accelerating. Public funding through the Recovery and Resilience Facility, cohesion funds, and Horizon Europe channels substantial investment into connectivity, cybersecurity, cloud, and AI, generating predictable demand pipelines

Opportunities:

- Compliance-native solutions aligned with new EU laws (DSA, DMA, AI Act, Data Act, NIS2).
- Vertical cloud and AI applications tailored to regulated sectors: health, manufacturing, public services.

- Cross-border digital tools (e.g., payments, returns management) supporting the growth of EU e-commerce.
- Interoperable, migration-friendly cloud/AI solutions that eliminate vendor lock-in and enable seamless movement between platforms — an emerging EU priority that creates strong opportunities for smaller, more agile companies not seeking hyperscaler-style monopolisation.

Looking ahead, **the EU aims to balance competitiveness with strategic autonomy, reducing reliance on non-European tech while facing global competition from the USA and China.** This dual strategy creates opportunities for companies that can support Europe's digital resilience and sovereignty.

3.2.3. EU Market Entry Opportunities and Collaboration with Ukraine

Looking toward 2030, the EU digital economy is set to expand in scale and diversity, with widespread broadband coverage, broader adoption of AI and cloud technologies, and improved digital skills. This growth creates a range of market opportunities across the EU.

In advanced digital economies such as Germany, the Netherlands, and Nordic countries, demand will remain strong for specialized IT services, cybersecurity solutions, and advanced AI and data analytics applications. These markets are competitive but offer potential for collaboration, joint R&D, and knowledge exchange, providing opportunities for Ukrainian tech companies to engage with EU partners.

In Southern and Eastern Europe, where digital adoption is accelerating, opportunities are emerging in infrastructure development, digital skills training, and the growth of local innovation ecosystems. EU investment through cohesion funding and recovery programmes is expected to stimulate demand, creating openings for Ukrainian IT firms to participate in cross-border projects, service provision, and joint innovation initiatives.

Overall, **the EU's efforts to reduce regional digital disparities not only aim to close gaps but also create diverse entry points for collaboration.** As digitalisation spreads beyond established hubs, Ukrainian companies can contribute expertise in software development, AI, cloud computing, fintech, and cybersecurity, supporting EU partners while expanding their own international footprint. **The long-term potential lies in leveraging complementary strengths, Ukrainian technical capacity, and EU market access** to drive innovation, economic growth, and deeper integration in the European digital ecosystem.

3.3. Policy Environment

The European Union has established a robust and multi-layered policy environment to facilitate the integration of Ukraine's dynamic digital sector into the EU's Single Market. Building on the foundational EU-Ukraine Association Agreement, a number of targeted programmes now provides Ukrainian IT clusters, SMEs, and research institutions with tangible pathways for collaboration, innovation, and market access. These initiatives represent a clear commitment to fostering a shared digital future and enhancing the resilience and competitiveness of both ecosystems.

3.3.1. Key Instruments for Cluster Collaboration

The EU's strategy for digital cooperation is operationalised through several key programmes, each designed to address different aspects of ecosystem development and market integration.

1. The European Cluster Collaboration Platform (ECCP): The Central Hub for Networking

The ECCP serves as the primary gateway for Ukrainian clusters to connect with their European counterparts. As part of Ukraine's participation in the Single Market Programme, the ECCP provides a vital tool for identifying partners, joining international projects, and participating in cross-border initiatives. An example of its impact is

the "Clusters Meet Regions" event series, which brings together stakeholders to foster technology transfer and SME innovation. For Ukrainian IT clusters, the ECCP is the main entry point for building consortia to access EU-funded projects [36].

2. The Enterprise Europe Network (EEN): Practical Support for SMEs

The Enterprise Europe Network (EEN) is the world's largest support network for SMEs with international ambitions. It provides Ukrainian businesses with hands-on support through its vast database of business opportunities and advisory services on EU regulations and market access. **The Kharkiv IT Cluster, as a key Ukrainian partner in the EEN consortium,** has successfully leveraged its resources to ensure business continuity for its members, helping them secure new clients and facilitating numerous partnership agreements [37].

3. EU4Digital: Aligning Policies and Infrastructure

EU4Digital is the EU's flagship regional programme for extending the benefits of the Digital Single Market to the Eastern Partnership countries. It helps Ukraine align its policies and legislation with EU norms in areas like eTrade, eHealth, and cybersecurity, removing technical and regulatory barriers to collaboration. The programme's work on creating a mutually recognized e-signature, for example, enables Ukrainian entrepreneurs to conduct business more seamlessly with European partners [10].

3.3.2. Strategic Partnerships in Action: The EU-Ukraine Cluster Partnership Programme

As a clear demonstration of its commitment, the European Commission launched the EU-Ukraine Cluster Partnership Programme [38]. The programme's primary objective is to support the integration of Ukrainian businesses into EU value chains and strengthen the capacity of Ukrainian clusters. It funds consortia of EU and Ukrainian clusters to develop joint strategies and provide direct support to SMEs.

Under this call, a diverse portfolio of projects was funded. Each targeting specific sectors and value chains. These partnerships illustrate the breadth of the EU's engagement:

- **ITBridge:** This initiative unites three of Ukraine's largest IT hubs—Kharkiv IT Cluster, Dnipro IT Community, and Odesa IT Family—with the Transilvania IT Cluster (Romania) and the Cluster Digital of Catalunya (Spain). The project is designed to enhance business support services, facilitate market access, and drive digital innovation [39].
- **reBUILD:** Focusing on the construction sector, this project links the Ukrainian Cluster Alliance with partners in Poland to support post-war reconstruction efforts and integrate Ukrainian construction SMEs into EU value chains through matchmaking and capacity building [40]).
- **EU-UA SUNRISE:** This initiative aims to build resilience in Ukrainian clusters by connecting them with EU partners in the sustainable and circular economy sectors. Coordinated from Portugal, it fosters a green transition by developing joint strategies and business models [41].
- **UA_EU_CLUSTER5.0:** Centered on the Industry 5.0 paradigm, this project connects Ukrainian clusters in packaging, engineering, and mechatronics with Romanian partners to accelerate the green and digital transitions and integrate them into EU industrial ecosystems [42].
- **EUkraineCoop:** This partnership targets the automotive and mobility sectors, linking the Ukrainian Automotive and Mobility Cluster with a leading digital cluster in Spain. Its goal is to strengthen the resilience of Ukrainian automotive companies and integrate them into EU supply chains [43].
- **Clusters4Health:** Led by Polish and Lithuanian health clusters, this project supports the integration of the Ukrainian Medical and Pharmaceutical Cluster into EU healthcare value chains, fostering joint innovation and contributing to the post-war recovery of Ukraine's health sector [44].

This portfolio of projects showcases a targeted, strategic approach to building tangible business and innovation bridges between Ukraine and the European Union, moving beyond policy statements to practical, on-the-ground collaboration [45].

3.3.3. Synergies with EU Funding and Research Programmes

These cluster-focused initiatives are amplified by and deeply integrated with the EU's primary funding instruments, notably Horizon Europe (HE) and the Digital Europe Programme (DEP). Ukraine's association with these programmes allows its research and innovation entities to participate on equal terms with EU member states. This access enables Ukrainian clusters and their members to engage in concrete, funded joint projects. The creation of six European Digital Innovation Hubs (EDIHs) in Ukraine, co-funded by the DEP, provides a "one-stop shop" for SMEs and public sector organisations to test new technologies and access training, further accelerating their integration [6].

3.3.4. Conclusion and Strategic Outlook

The integration of Ukraine's digital sector into the European framework has accelerated rapidly since 2022. Policy instruments and programmes **offer tangible pathways for Ukrainian companies to access EU markets, co-develop innovations and contribute to shared European innovation goals**, underscoring the EU's strategic commitment to a more resilient and interconnected digital economy.

However, structural barriers still constrain depth and speed of integration. Using a PESTEL methodology, the key constraints are set out below to clarify where targeted action is needed and which actors can unlock the next steps of growth and trust.

- **Political Factors (P):** Political will from both the EU and Ukraine drives accelerated integration, granting Ukraine access to key programmes such as the Ukraine Facility (2024–2027) with up to €50 billion and the Digital Decade Policy Programme 2030. However, the full-scale war remains the main risk, causing investment uncertainty. A key operational challenge for IT companies is the unclear mechanism for reserving essential employees from mobilization, affecting their ability to maintain international contracts.
- **Economic Factors (E):** The digital sector is a key economic pillar for Ukraine, with IT service exports reaching $6.4 billion in 2024. International institutions like the European Investment Bank (EIB) and International Finance Corporation are channeling targeted capital. However, the main economic challenge is an acute shortage of accessible long-term capital due to a high perception of risk. A key barrier is the requirement for physical collateral for bank loans, which is unsuitable for the IT sector's reliance on intangible assets, creating a "funding gap" at the crucial scaling stage.
- **Sociocultural Factors (S):** Human capital remains Ukraine's key competitive advantage. However, effective integration is hampered by the language barrier, cited as an obstacle by 53% of Ukrainian refugees in the EU. Furthermore, the mobilization of male specialists is creating a talent shortage within Ukraine, with over 60% of companies experiencing hiring difficulties. A sharp drop in job offers for junior-level positions (down 64% for Juniors and 81% for Interns) risks creating a deficit of experienced mid-level professionals in the future.
- **Technological Factors (T):** Ukraine demonstrates high technological adaptability, particularly in the DefenceTech and GovTech sectors. However, a critical issue is the systemic vulnerability due to the use of hostile (Russian) software. Up to 500,000 Ukrainian companies reportedly still use Russian software (e.g., 1C, Bitrix), creating a direct risk of data manipulation and undermining overall cyber-resilience. Ukraine's inability to rapidly transition away from this software reduces international partners' trust in the protection of shared data.
- **Environmental/Infrastructural Factors (E):** This factor focuses on physical resilience. Consistent attacks on critical energy and civil infrastructure pose a constant threat to the stability of electricity supply and communication. The resilience of the digital sector directly depends on the physical robustness of the energy system. Successful integration into the Digital Single Market requires

guarantees of business continuity, making investments in IT inextricably linked to investments in decentralized, protected energy solutions.

- **Legal and Regulatory Factors (L):** Ukraine has a robust legal foundation for integration, including its signatory status to the Lisbon Recognition Convention and alignment with the European Qualifications Framework. Despite these advantages, a critical barrier is the systemic failure in the practical recognition of qualifications. EU institutions (ENIC/NARIC) are often under-resourced to handle complex assessment processes, turning a legal advantage into a de facto barrier. Domestically, inconsistent application of rules within Diia.City and the slow pace of judicial reform remain systemic risks that deter large-scale capital investment.

Leveraging existing EU-UA collaboration instruments to tackle the bottlenecks above will turn political intent into bankable cross-border deal flow and accelerate Ukraine's integration into Digital Single Market.

4. EU-UKRAINE COOPERATION POTENTIAL IN THE DIGITAL MARKET VALUE CHAINS

4.1. Analytical Framework

To define a EU-Ukraine cooperation potential in the digital sector, the study applies a **mixed-methods approach, combining desk research, qualitative insights from two focus groups with quantitative data from two expert surveys and follow-up consultations.** The methodology is designed to systematically map the **strengths, weaknesses, needs, and interests** of both the Ukrainian and EU digital markets. Findings from these activities are synthesised into **four analytical matrices** that **cross-reference 14 key industries with 14 technology domains** to pinpoint collaboration opportunities and practical entry points.

Key Industries Analysed

1. Agriculture & Food
2. Defence & Security
3. Education & Training
4. Energy & Utilities
5. Finance & Insurance
6. Government & Public Sector
7. Healthcare & Pharmaceuticals
8. Hospitality & Tourism
9. Manufacturing & Industry 4.0/5.0
10. Media & Entertainment
11. Real Estate & Construction
12. Retail & E-commerce
13. Telecommunications
14. Transportation & Logistics

Technology Domains Analysed

The 14 technology domains were structured into a hierarchical ecosystem, validated by Ukrainian and European IT experts, to reflect the evolutionary nature of digital infrastructure.

1. **Foundational Level (Hardware & Communication Infrastructure):**
   a. Semiconductors & Microelectronics: The foundation for all digital technologies.
   b. 5G & Next-Gen Connectivity: Enables high-speed, reliable data transmission.
2. **Infrastructure Level (Computing & Distributed Systems):**
   a. Cloud, Edge & Fog Computing: Creates the computational basis for scalable digital services.
3. **Data and Sensor Level:**
   a. IoT & Embedded Systems: Generate data.
   b. Big Data & Analytics: Process and interpret this data.
4. **Security and Trust Level:**
   a. Cybersecurity: Protects systems and data.
   b. Blockchain & Distributed Ledger: Ensures trust and transparency in interactions.
5. **Intelligence and Autonomy Level:**
   a. AI & ML: Extract value from data and enable decision-making.
   b. Robotics & Automation: Apply intelligence in the physical world.
   c. Unmanned Vehicles: A specialized domain of autonomous systems.
6. **Interface and Interaction Level:**
   a. AR/VR/XR: Create next-generation human-machine interfaces.
   b. Web Platforms & Applications: Implement user and business services.

c. Enterprise Process Automation: Integrate digital technologies into business processes.

7. **Next-Generation Technologies:**
   a. Quantum Technologies: The next leap in computing and communication capabilities.

Cooperation Matrices

- **Matrix 1 Ukrainian IT Sector Strengths and Capacities**: assesses the maturity and export-readiness of Ukrainian IT companies.
- **Matrix 2 EU Needs and Technological Dependencies:** identifies EU industries' reliance on non-European technology suppliers, highlighting strategic vulnerabilities.
- **Matrix 3: Ukraine's Digital Dependencies**: maps Ukraine's reliance on software and solutions from countries like Russia, Belarus, and China.
- **Matrix 4: EU Interest in the Ukrainian Market**: gauges the interest of EU companies in collaborating with Ukraine across different technologies and industries.

The sub-sections below will present the study findings structured into four matrices. A comparative analysis of these matrices reveals strategic opportunities for building resilient and mutually beneficial value chains.

4.2 Matrix 1: Ukrainian IT Sector Strengths and Capacities

Matrix #1 was developed based on the outcomes of the Ukrainian focus group that took place on April 30, 2025 and engaged representatives (executives and founders) from IT companies, IT and industry-specific clusters, and business support organisations in Ukraine (30 persons form 26 organisations).

Objective:

The primary objective of the 120-minute session was **to evaluate Ukraine's current strengths, weaknesses, and development** potential across 14 key technology domains. **The goal was to achieve expert consensus and identify strategic areas for growth and cooperation with the EU.** The results of this session formed the basis for Matrix #1: where Ukrainian IT companies have strengths and capacities.

Method:

1. **Initial Expert Voting.** Using an interactive instrument, participants anonymously answered the core question: *"Based on your expert assessment, how strong is Ukraine's technological sector (expertise, positions, business environment) in each of the 14 technologies?"* on a 1-10 scale. The resulting value for each technology is referred to as its **technology strength score**.
2. **Consensus and Divergence Analysis.**
   a. If opinions aligned (technology strength score range ≤ 2 points), the group held a brief confirmation discussion.
   b. If there was no consensus (technology strength score range ≥ 3 points), participants explained their reasoning, followed by an expert discussion and one re-voting round. Individual opinions were recorded for transparency.
3. **Classification of technologies by current positioning.** After the voting rounds, two groups of technologies were identified based on Ukraine's global positioning by technology, expressed in the average technology strength score:
   a. Frontier Leader (technology strength scores from 9.0 to 10.0)
   b. Strong Performer (technology strength scores from 6.0 to 8.9)
4. **Assessment of Development Potential.** For technologies with the technology strength scores <6.0, the focus group participants completed a Google Form answering a question *"Does Ukraine have*

strong potential to develop in this technology?" on a 10-point scale. The resulting value is referred to as the **technology potential score**.

5. **Classification of technologies by potential positioning.** Based on the average technology potential scores, two additional groups of technologies were identified characterising the Ukraine's potential global positioning by technology:
    a. Emerging Player (technology potential scores from 6.0 to 10.0)
    b. Non-Participant: (technology potential scores up to 5.9)
6. **Market Mapping.** For technologies, where Ukraine's positioning is Frontier Leader, Strong Performer and Emerging Player, the focus group participants identified relevant cases and clients where these technologies are already applied or could be utilised in specific industry sectors. Depending on the number of cases identified by the focus group participants, an intensity of Ukrainian suppliers presence was categorised in the following way:
    a. Extensive Supplier Presence (≥60% of experts flagged export cases)
    b. Solid Supplier Presence (35-59% of experts flagged export cases)
    c. Niche Supplier Presence (10-34% of experts flagged export cases)
    d. No Demonstrated Supplier Presence (<10% of experts flagged export cases)

Classification of technologies by current positioning	**Frontier Leader** Mature, internationally distinctive capability with proven delivery at scale and deep talent	**Strong Performer** Established export capability with competitive delivery today and clear headroom to scale
Classification of technologies by potential positioning	**Emerging Player** Credible basis to develop to competitiveness within 5+ years; priority for targeted pilots/partnerships	**Non-Participant** Limited near-term prospects; not a current focus beyond exploratory monitoring.
Market Mapping	**Extensive Supplier Presence** Broad, verified activity: multiple Ukrainian suppliers, multi-client deployments, recurrent exports/references – stable delivery capacity **Emerging Player** Selective, bespoke activity: a small number of unique, client-specific deployments with a high fit for specialised needs, limited breadth or repeatability	**Solid Supplier Presence** Consistent activity: verified cases, growing references/teams – credible capacity with room to scale **No Demonstrated Supplier Presence** No verified cases to date – activity unconfirmed or not observable

Figure 14: Description of the Classification of technologies by positioning and Market Mapping for the Matrix 1

Outcomes:

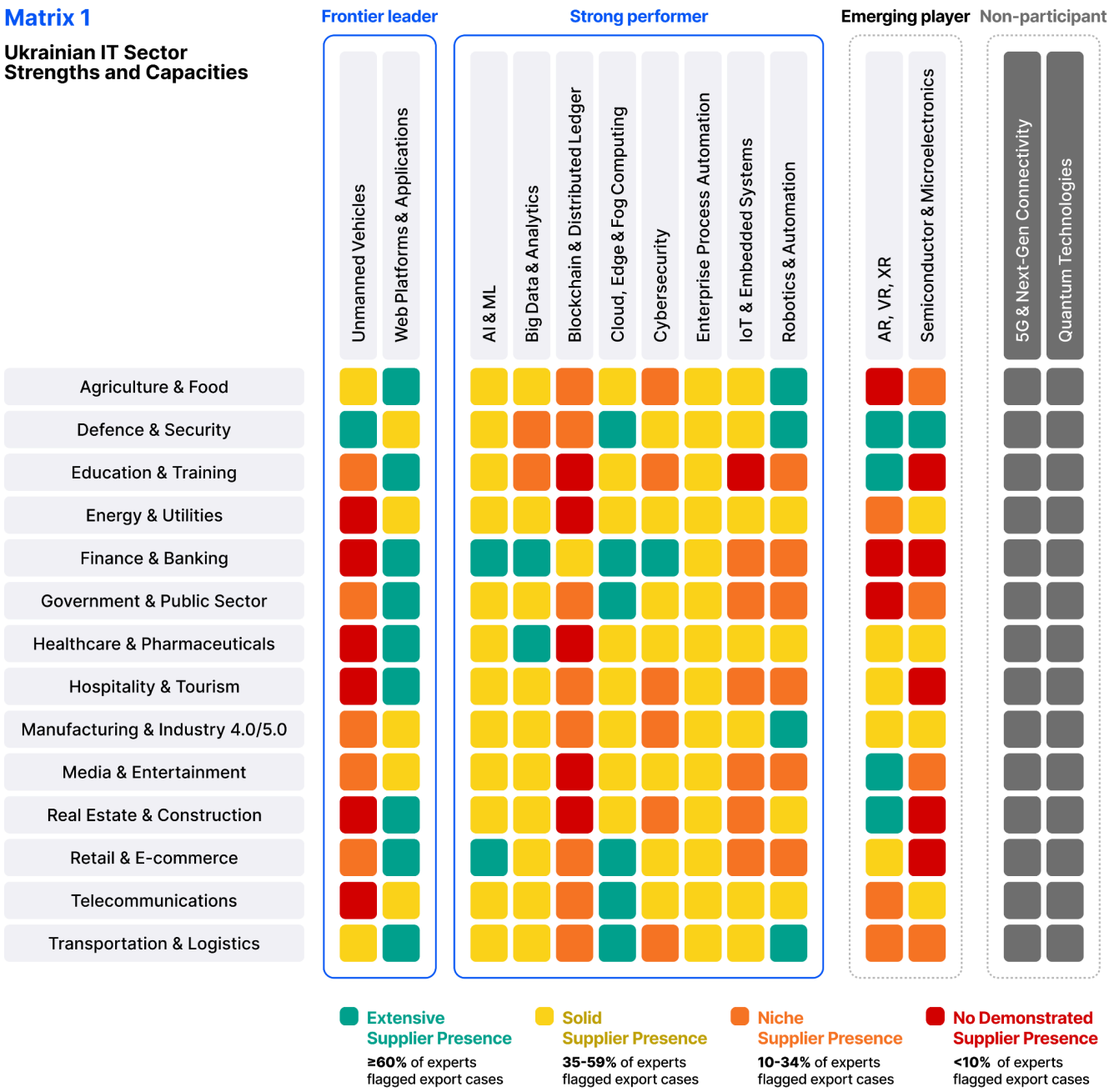

Figure 15: Matrix 1 Ukrainian IT Sector Strengths and Capacities: assesses the maturity and export-readiness of Ukrainian IT companies.

Frontier Leader: internationally distinctive capability

(Web Platforms & Applications; Unmanned Vehicles)

The **Frontier Leader** domains reflect mature, internationally distinctive capabilities with demonstrated delivery at scale and deep talent availability in Ukraine. These areas are immediately suitable for structured EU–Ukraine collaboration, including co-development and deployment within EU value chains, subject to standard certification and conformity assessment pathways. They offer near-term opportunities to translate policy intent into operational projects across priority sectors.

The **Frontier Leader** category represents technology domains where Ukraine demonstrates internationally distinctive capabilities — mature expertise, scalable business models, and a proven record of export delivery.

These are areas ready for immediate co-development and integration into EU value chains after standard certification procedures.

The **Web Platforms & Applications** domain builds on over a decade of experience in developing complex, large-scale digital solutions across multiple verticals — education, finance, public administration, and media. Ukrainian IT companies provide end-to-end services compliant with EU data protection and cybersecurity standards, powering global platforms for clients such as the EBRD, NASA, and European OTT/VoD providers. The sector is characterised by agility, strong engineering culture, and the ability to scale quickly across markets.

Ukrainian technology companies provide best-in-class solutions in Web Platforms and Application for all industries. **The highest density of propositions are concentrated in solutions for the next industries:**

- ☑ Agriculture and Food Industry
- ☑ Education and Training Industry
- ☑ Finance and Banking Industry
- ☑ Government and Public Sector
- ☑ Healthcare and Pharmaceuticals Industry
- ☑ Hospitality and Tourism Industry
- ☑ Real Estate and Construction Industry
- ☑ Retail and E-commerce Industry
- ☑ Transportation and Logistics Industry.

The **Unmanned Vehicles** domain has become one of Ukraine's most distinctive technological growth stories since 2022. The full-scale war served as a powerful **catalyst**, accelerating the emergence of an entire industry around unmanned systems — aerial, ground, and maritime. Over just three years, Ukraine developed a unique innovation culture built on **rapid prototyping, extreme testing environments, and ultra-short innovation cycles**. The urgency of the wartime context, with no luxury of four-year product development timelines, forced companies and engineers to achieve technological breakthroughs in months. This environment fostered a generation of innovators capable of delivering operationally tested, modular, and cost-efficient dual-use technologies.

The key industry where those technologies are now applying is Defence & Security with a dual-use shift to Agriculture, Transport&Logistics

In conclusion, the combination of advanced **Web Platforms & Applications** and cutting-edge **Unmanned Vehicles** positions Ukraine as a "fast-track partner" for EU cooperation — enabling tangible, near-term projects in logistics, manufacturing, public services, and security domains. These are the sectors where political commitments can be swiftly transformed into measurable economic and strategic impact.

Strong Performer: established export-ready capability

(AI & ML; Big Data & Analytics; Blockchain & Distributed Ledger; Cloud, Edge & Fog Computing; Cybersecurity; Enterprise Process Automation; IoT & Embedded Systems; Robotics & Automation)

The **Strong Performer** group represents Ukraine's established, export-ready technological competencies that already demonstrate proven market traction and cross-border delivery experience. These domains form the **operational backbone of Ukraine's digital economy**, integrating into European value chains through outsourced R&D, managed services, and turnkey product delivery.

Ukraine's strong engineering base and cost-efficient innovation model have driven rapid growth in **AI/ML**, **Big Data**, and **Cloud Computing**, where domestic companies deliver analytics, data infrastructure, and intelligent automation for FinTech, GovTech, retail and e-commerce, travel and hospitality, logistics, healthcare and pharmaceuticals, telecommunications.

The separate place **AI/ML got in the Defence and Security** industry, together with **Cybersecurity** and **Blockchain** technologies have advanced in parallel, underpinned by practical experience in resilience engineering during wartime, with numerous companies providing trusted cybersecurity and secure transaction services.

At the same time, **Enterprise Process Automation**, **IoT & Embedded Systems**, and **Robotics & Automation** are transitioning from niche specialisations to broader industrial adoption. Ukrainian teams are increasingly integrating automation and sensor-based solutions into Agritech, Defence & Security, manufacturing, energy, transport, travel and hospitality and industrial operations — aligning with EU goals for digital sovereignty and industrial resilience.

In summary, these eight domains represent Ukraine's **core layer of digital export capability**: reliable, scalable, and aligned with EU standards. With targeted investment and coordinated market access mechanisms, they are poised to expand into higher value-added positions within Europe's industrial, defence, and green

Emerging Player: credible basis for future growth

(AR / VR / XR; Semiconductors & Microelectronics)

The **Emerging Player** domains demonstrate strong potential for Ukraine to reach global competitiveness within the next 3–5 years. They represent rapidly evolving sectors where domestic R&D capacity, pilot implementations, and strategic industrial demand are converging — providing a credible foundation for accelerated growth through EU cooperation and investment.

The **AR / VR / XR** segment is expanding across several high-impact verticals — **defence and security**, **education and training**, **entertainment**, and **real estate and construction**. The combination of Ukraine's creative talent, gaming expertise, and engineering skills enables the production of realistic simulation environments and immersive learning tools used in both civilian and military applications. The wartime environment catalysed an unprecedented demand for virtual training systems, remote mission planning, and rapid scenario modelling — accelerating innovation and deepening technical competence in these technologies.

The **Semiconductors & Microelectronics** sector is emerging as one of the most strategically significant. The full-scale war and disrupted global supply chains have triggered a domestic **boom in microelectronics**, driven by the urgent need to replace imported components — particularly those from China — and to develop sovereign capabilities for the **defence and security industries**. Ukrainian engineers have established small-scale production and design hubs for sensors, control units, and integrated modules, building early-stage capacity for localisation and future alignment with EU semiconductor initiatives.

In essence, these two domains symbolise Ukraine's transition from a software service economy toward **deep-tech and hardware innovation**. With structured support for technology maturation and integration into EU industrial ecosystems, they could evolve into next-generation pillars of Ukraine's high-tech export growth and strategic autonomy.

4.3 Matrix 2: EU Industrial Needs and Technological Dependencies on Non-EU Partners

Matrix #2 was developed based on the outcomes of the European focus group that took place on May 23, 2025 and was composed of representatives from IT and other industry clusters, business support organisations, and executives from IT companies from EU member states (11 countries, 33 persons from 31 organisations).

Objective:

The primary objective of the 120-minute session was **to identify the needs, gaps, and dependencies of EU industries in digital technologies and to explore potential areas for cooperation with Ukrainian technology companies and clusters.** This session formed the basis for Matrix #2: where EU industries have needs, gaps, or dependencies on non-European partners, with dependency assessed at two levels: **Industry Exposure** for entire industries, and **Technology Dependence Level** for specific technologies within those industries..

Method:

Working in line with the "World Café" methodology, participants were divided into **three round tables, each focusing on a specific group of industries**, representing key vectors of digitalisation and facilitating comparison of challenges and dependencies across different industrial sectors. The three industry groups were:

- **Assets Heavy.** These industries are capital-intensive, dependent on physical infrastructure, and oriented toward industrial technologies like automation, IoT, and robotics:
    - Manufacturing & Industry 4.0/5.0
    - Agriculture & Food
    - Transportation & Logistics
    - Real Estate & Construction
    - Energy & Utilities
    - Defence & Security
- **Consumer-Facing & Experience-Driven.** These industries work directly with end-users, relying on digital channels, user experience and personalisation:
    - Retail & E-commerce
    - Travel & Hospitality
    - Media & Entertainment
    - Education & Training
- **Data & Regulation Critical.** These industries are united by high data sensitivity, strict regulation (e.g., GDPR, HIPAA), and the critical importance of cybersecurity and trust:
    - Healthcare & Pharmaceuticals
    - Finance & Banking
    - Government & Public Sector
    - Telecommunications

Participants were shifted between round tables, ensuring all experts provided input on every category. Each table discussed the key question: *"Where do EU industries have needs, gaps, or dependencies in terms of digital technologies?"* Each round table followed a three-step process:

1. **Initial Expert Voting.** Using an interactive instrument, participants anonymously answered the core question: *"How would you assess the level of dependency of each of the 14 industries on non-EU products?"* on a 1-10 scale. The resulting value is the **score of industry exposure to non-EU digital**

solutions. As a result of expert voting, all the EU industries were categorised, according to their level of exposure to non-EU digital products/solutions, into:

a. Severe exposure (industry exposure scores from 9.0 to 10.0)
b. Elevated exposure (industry exposure scores from 6.0 to 8.9)
c. Manageable exposure (industry exposure scores from 3.0 to 5.9)
d. Limited exposure (industry exposure scores up to 2.9)

2. **Mapping specific technologies linked to these exposure.** Depending on the number of cases identified by the focus group participants, technology-driven dependencies were categorised within the industries as:
    a. Critical dependence (≥60% of experts flagged dependency)
    b. Significant dependence (35–59% of experts flagged dependency)
    c. Moderate dependence (10–34% of experts flagged dependency)
    d. Low / Negligible dependence (<10% of experts flagged dependency)
3. **Discussing business cases** related to the identified industry exposure and technology dependencies, focusing on problems, risks, and opportunities.

Level of exposure to non-EU digital products/solutions	**Severe exposure** High reliance on non-EU digital solutions that materially affects continuity, security, or compliance; urgent mitigation is warranted	**Elevated exposure** Substantial reliance on non-EU solutions; mitigation is feasible but requires coordinated action and governmental support
	Manageable exposure Some reliance on non-EU solutions, but substitution pathways exist and can be executed over the medium term	**Limited exposure** Low reliance; EU/local alternatives are available and in use, supporting practical digital sovereignty.
Technology-driven dependencies based on the level of exposure	**Critical dependence** Operationally significant lock-in to non-EU technology for this use case; immediate substitution planning is required	**Significant dependence** Notable dependence on a non-EU platform/toolset; substitution needs policy/financial support and structured migration
	Moderate dependence Mixed vendor landscape with identifiable alternatives; substitution is plausible as capabilities and supply mature. Prime for collaborative development	**Low / Negligible dependence** Minimal dependence on non-EU solutions; EU/local options meet actual needs

Figure 16: Description of the Levels of exposure and Technology-driven dependencies for the Matrix 2

Outcomes:

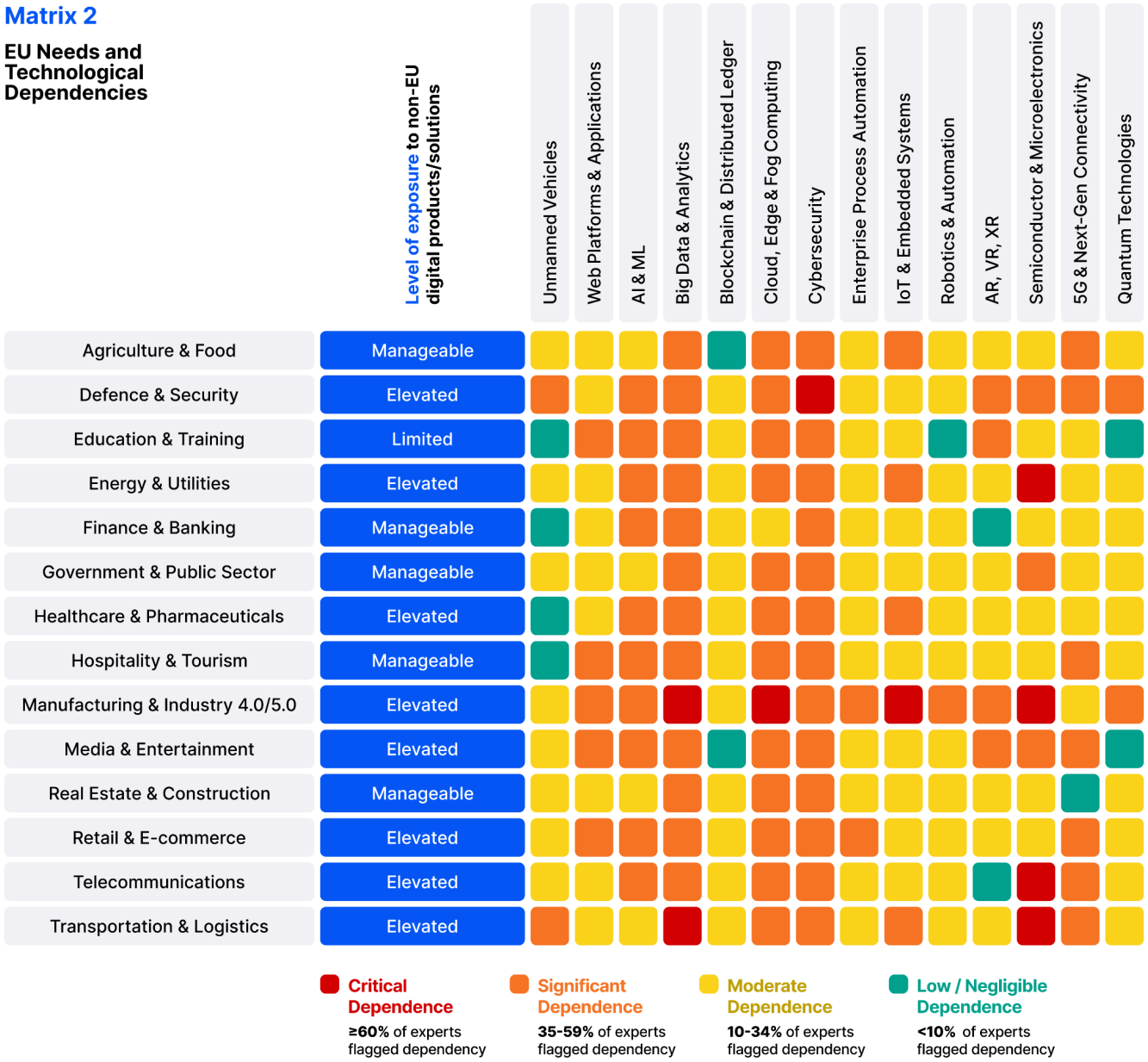

Figure 17: Matrix 2 EU Needs and Technological Dependencies: identifies EU industries' reliance on non-European technology suppliers, highlighting strategic vulnerabilities.

Overall EU Industrial Dependency

The data indicates a significant to critical dependency of major EU industries on external ecosystems. **Sectors with the highest dependency scores are Transportation & Logistics, Retails & E-commerce, Manufacturing & Industry 4.0/5.0, Energy & Utilities, Telecommunications, and Defence & Security.** This establishes a broad, strategic need for the EU to secure its supply chains and technological inputs, particularly in industries fundamental to its economic stability and security. **Even sectors with "moderate" dependency, such as Healthcare & Pharmaceuticals, Agriculture & Food and Real Estate & Construction, show notable reliance on non-EU partners, underscoring a continent-wide challenge.**

Specific EU Technological Gaps & Dependencies

The matrix provides a granular view of the EU's technological vulnerabilities, which can be categorized by their level of severity:

- **Critical Dependency:** The EU's most acute vulnerability lies in Semiconductors & Microelectronics, which received the highest dependency score in the crucial Manufacturing sector. Other critical dependencies include AI & ML and Cloud, Edge & Fog Computing, particularly in high-stakes sectors like Defence & Security and Manufacturing, indicating that the EU lacks leadership in core next-generation infrastructure.
- **Significant Dependency:** A broad structural dependency is evident across a suite of advanced digital technologies. AI & ML, Cloud Computing, Cybersecurity, and Big Data & Analytics consistently score in this range, especially within the Transportation, Media, and Telecommunications industries.
- **Moderate Dependency:** The EU demonstrates a moderate dependency in areas like IoT & Embedded Systems, Robotics & Automation, and Unmanned Vehicles. These areas are prime for collaborative development.
- **Low Dependency:** The EU shows a high degree of self-sufficiency in more mature software domains like Web Platforms & Applications and Enterprise Process Automation.

The analysis points to a critical hardware-software divide, with the EU's most severe dependency on physical hardware (Semiconductors) and a significant structural gap in advanced digital infrastructure (AI&ML, Cloud/Edge). These gaps signal an urgent demand for reliable partners to enhance the EU's strategic autonomy.

4.4 Matrix 3: Ukraine's Digital Dependencies on Non-European Solutions

To generate Matrix #3, an online survey was conducted among Ukrainian enterprises of all sizes to learn where Ukraine has needs, gaps, or dependencies on non-European partners. (June 1 - June 30, 2025, number of responses - 35). The main question was *"In which areas does Ukraine depend on digital solutions or software from other countries (specifically Russia, Belarus, China, etc.)?"* The responses were aggregated to identify level of dependency for specific technologies and industries, identifying:

- **Critical dependency** (≥60% of experts flagged dependency).
- **Significant dependency** (35–59% of experts flagged dependency).
- **Moderate dependency** (10–34% of experts flagged dependency).
- **Low / Non-Critical dependency** (<10% of experts flagged dependency).

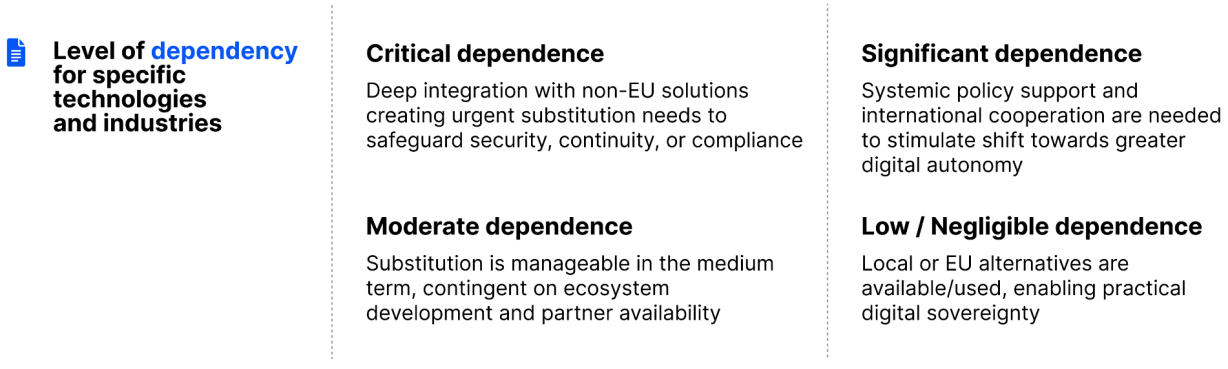

Figure 18: Description of the Levels of dependency for specific technologies and industries for the Matrix 3

The matrix below visualises the dependency of Ukraine's industries and digital ecosystem on software and solutions originating from outside the EU/UK/EEA.

Matrix 3

Ukraine's Digital Dependencies

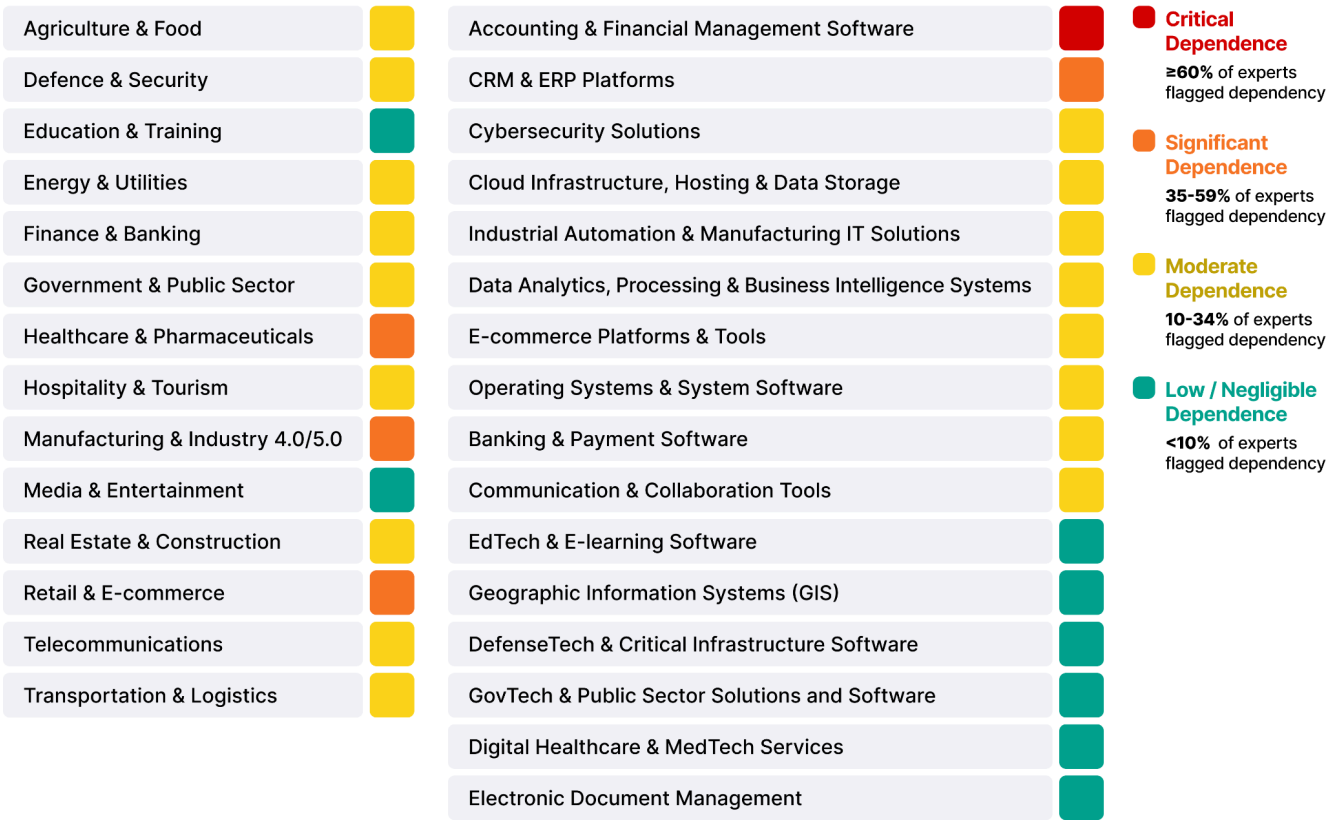

Figure 19: Matrix 3 Ukraine's Digital Dependencies: maps Ukraine's reliance on software and solutions from countries like Russia, Belarus, and China.

Level of dependency on specific IT solutions and products

- ☐ **Critical Dependency:** Ukraine's most significant vulnerability is its reliance on non-EU Accounting/Financial Software and CRM/ERP Systems, which are foundational to economic activity.
- ☐ **Significant Dependency:** There is a dependency on non-EU cybersecurity solutions, suggesting reliance on external platforms despite homegrown expertise.
- ☐ **Moderate Dependency:** This includes Cloud Services, Manufacturing/Industrial IT Solutions, Operating Systems, and Data Analytics Systems, indicating a mixed ecosystem.
- ☐ **Low Dependency:** Ukraine demonstrates low dependency on non-EU software for GIS, Military and Critical Infrastructure, and Public Sector applications, largely due to the success of domestic initiatives like the Diia platform.

Level of dependency within specific industries

- ☐ **Critical Dependency:** The most dependent sectors are Manufacturing & Industry 4.0/5.0 and Retail & E-commerce, which are deeply integrated with non-EU ecosystems for core business management.
- ☐ **Significant Dependency:** Healthcare & Pharmaceuticals and Transportation & Logistics exhibit significant reliance on external digital tools.
- ☐ **Moderate Dependency:** A broad range of sectors, including Finance & Banking, Energy & Utilities, Telecommunications, and Agriculture & Food.

- ☐ **Low Dependency:** The Government & Public Sector and Defence & Security sectors display the lowest dependency, reinforcing Ukraine's success in cultivating digital sovereignty in strategic state functions.

The data reveals a core enterprise software gap in Ukraine's private sector, contrasted by a model of digital sovereignty in governance. This highlights a clear opportunity for EU-based providers to help Ukraine diversify its sources of core business software.

4.5 Matrix 4: EU Interest in the Ukrainian Market

To create Matrix #4, an online survey of EU companies and business support organisations was conducted to assess the interest in collaborating with Ukrainian IT across technologies and industries (June 13 - July 13, 2025, number of responses - 26), identifying:

- **High Interest** (≥60% of experts flagged interest).
- **Medium Interest** (35–59% of experts flagged interest).
- **Low Interest** (10–34% of experts flagged interest).
- **Minimal/No Interest** (<10% of experts flagged interest).

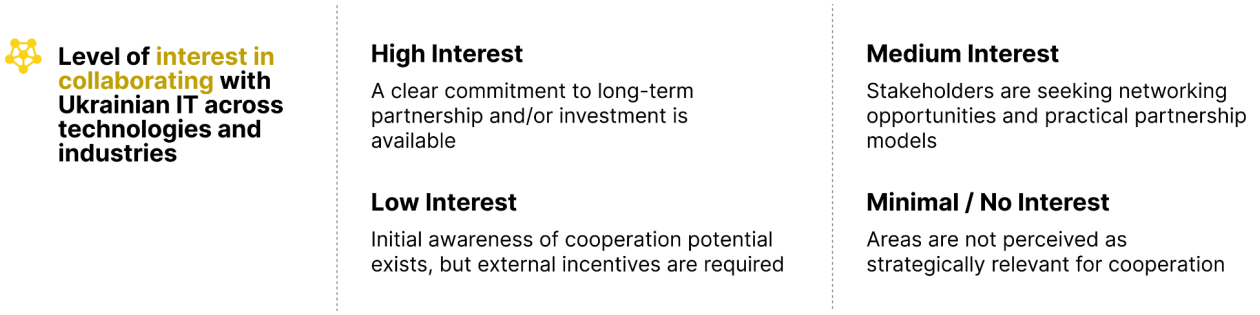

Figure 20: Description of the Levels of interest in collaborating with Ukrainian IT for the Matrix 4

Outcomes:

Matrix 4

EU Interest in the Ukrainian Market

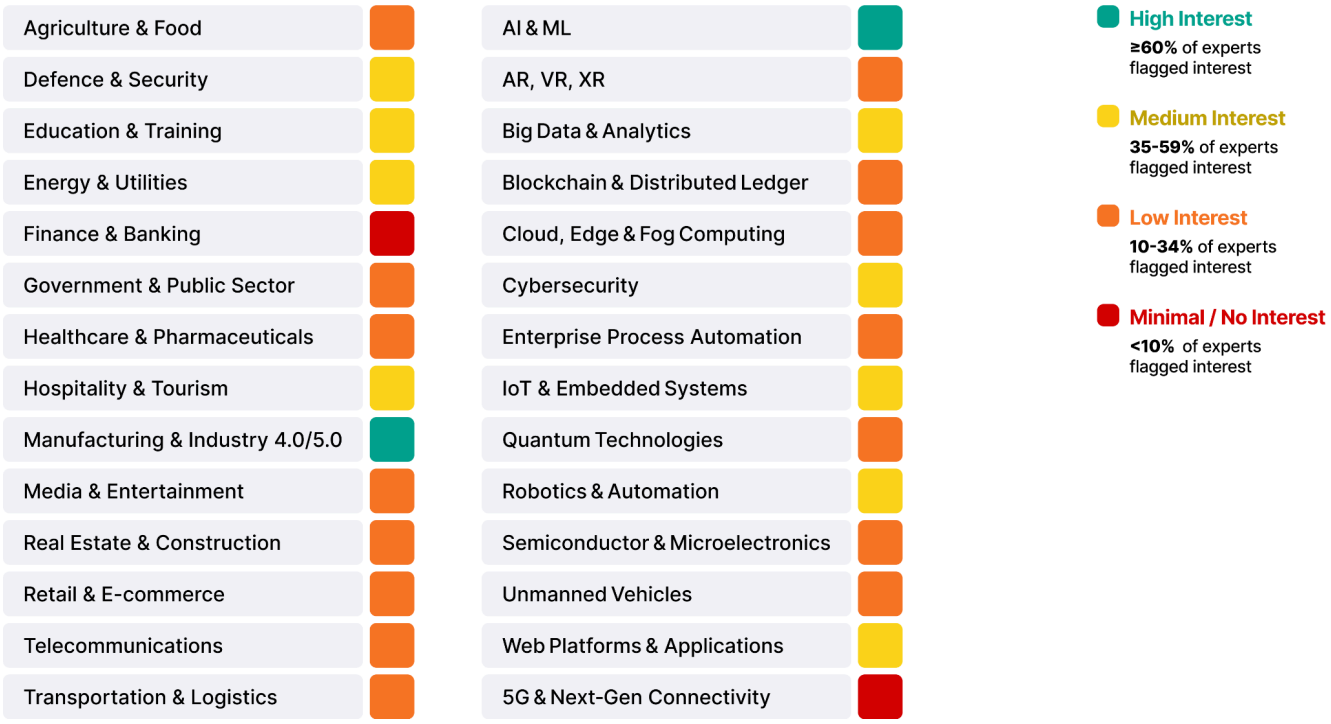

Figure 21: Matrix 4 EU Interest in the Ukrainian Market: gauges the interest of EU companies in collaborating with Ukraine across different technologies and industries.

Level of Interest in collaboration on specific technologies

- ☑ **High Interest:** This tier is dominated by AI & ML, followed by IoT & Embedded Systems and Robotics & Automation, representing the highest strategic priority for collaboration.
- ☑ **Medium Interest:** This group includes Big Data & Analytics and Cybersecurity, indicating they are important but secondary priorities.
- ☑ **Low Interest:** This category includes Web Platforms & Applications, AR/VR/XR, Enterprise Process Automation, and Unmanned Vehicles.
- ☑ **No/Minimal Interest:** Foundational or niche technologies like Cloud/Edge/Fog Computing, Blockchain, Semiconductors, Quantum and 5G Technologies currently attract minimal interest for this type of collaboration.

Level of Interest in collaborating within specific industries

- ☑ **High Interest:** Manufacturing & Industry 4.0/5.0 is the clear primary focus for collaboration.
- ☑ **Medium Interest:** Defence & Security is the sole industry in this tier, indicating a solid but less intense level of interest.
- ☑ **Low Interest:** This is the largest group, including Healthcare, Energy & Utilities, Education, Agriculture, Transportation, and the Public Sector.
- ☑ **No/Minimal Interest:** Sectors like Retail, Telecoms, Hospitality, and Finance show very low potential for collaboration based on this data.

The analysis concludes that EU organisations are seeking tangible, project-based partnerships in advanced industrial technologies rather than general outsourcing.

4.6 Analysis and Key Outcomes

Summarising the above, we conducted an in-depth analysis, incorporating two focus groups and two comprehensive surveys with Ukrainian and European stakeholders, to identify key value chains and cooperation opportunities in the EU-Ukraine digital sector. The participants included executives and founders of technology companies, representatives from IT and industry-specific clusters, and business support organisations from Ukraine and EU Member States (Belgium, Croatia, Estonia, Germany, Hungary, Italy, Latvia, Poland, Portugal, Romania, and Spain). Below we describe the strategic landscape for the EU-Ukraine digital cooperation identified as a superposition of synthesised analytical matrices.

4.6.1 Ukraine as a Supplier for EU Needs

This analysis compares the Ukrainian IT sector strength and capabilities (Matrix #1) with the EU industrial needs and technological dependencies (Matrix #2) to identify key areas of strategic alignment. The comparison reveals a significant overlap, positioning Ukrainian IT and tech companies to address some of the EU's most pressing needs.

Direct Alignment: Addressing EU's High Dependencies with Ukrainian Strengths

This category identifies areas where the EU's significant dependencies directly align with Ukraine's proven strengths, representing the most immediate opportunities for partnership.

- ☑ **AI & ML, Big Data & Analytics, and Cloud/Edge Computing:** The EU's significant structural dependency on these core digital infrastructure technologies across key industries (Manufacturing, Defence, Telecoms) aligns with Ukraine's established strengths and growing potential, making it a prime partner for expertise and talent.
- ☑ **Cybersecurity:** The EU's significant dependency on external cybersecurity solutions aligns perfectly with Ukraine's unique, battle-tested strength in this domain, offering access to highly resilient, real-world expertise.
- ☑ **Unmanned Vehicles and Robotics & Automation:** The EU's critical dependency in manufacturing and significant need in defence for these technologies matches directly with Ukraine's proven strength and emerging potential, creating a clear opportunity for co-development.
- ☑ **IoT & Embedded Systems:** The EU has a moderate but widespread need for IoT, particularly in Transportation and Energy. This is an area of established strength for Ukraine, presenting a ready-made opportunity for specialized solutions and integration services.

Mismatched Priorities and Long-Term Opportunities

This category highlights areas where alignment is less direct.

- ☑ **Web Platforms & Enterprise Automation:** The EU has a low dependency in these areas. While Ukraine is strong here, the opportunity is less about filling a strategic gap and more about competing in a mature market, likely through high-quality, cost-effective service outsourcing.
- ☑ **Semiconductors & Microelectronics:** This is the EU's most critical systemic dependency. As Ukraine's capacity is still nascent, this points to a long-term opportunity for strategic co-investment in R&D and manufacturing.
- ☑ **5G & Quantum Technologies:** The EU has a high dependency, but Ukraine currently has an absence of capacity. This signals a shared gap, suggesting collaboration should focus on joint, long-term R&D.

Ukrainian businesses are exceptionally well-positioned to address the EU's high-demand gaps in AI, Big Data, and Cybersecurity. While Ukraine cannot solve the EU's critical hardware dependency in the short term, the alignment of needs and potential creates a compelling case for long-term joint R&D and co-investment. Partnering with Ukraine's agile and skilled tech sector is a strategic imperative for the EU to strengthen its digital sovereignty. *(For specific success stories and detailed case examples from Ukrainian IT companies that substantiate this analysis, please refer to Appendix 2.)*

4.6.2 Strategic Opportunities for EU-Ukraine Collaboration

By cross-referencing Ukraine's technological dependencies with the EU's cooperation interests, we can identify specific, high-potential areas where EU businesses are best positioned to fill critical gaps.

- ☑ **Advanced Industrial & Manufacturing Solutions:** The strongest opportunity for cooperation lies in modernizing Ukraine's manufacturing sector. EU businesses are highly motivated to co-develop and implement advanced Industry 4.0/5.0 solutions, directly addressing Ukraine's critical dependency by providing expertise in AI/ML, IoT, and Robotics.
- ☑ **Strengthening Digital Sovereignty and Resilience:** EU companies are well-positioned to address Ukraine's significant dependency on external cybersecurity solutions. The matched level of interest and need creates a clear path for partnerships aimed at replacing non-European security products and fortifying critical digital infrastructure.

The most promising collaborations are not in replacing general-purpose software (like accounting or CRM, where Ukraine's dependency is highest but EU interest is low) **but in co-creating specialized, high-tech solutions.** The data strongly suggests that EU policy and business support should focus on facilitating partnerships in advanced manufacturing, industrial automation, and cybersecurity to foster Ukraine's economic development while enhancing its national and, by extension, European resilience.

Finally, the combined insights from the four analytical matrices reveal a rare and strategically significant alignment — a *Golden Triangle of Opportunity* — where Ukraine and the European Union stand not as "supplier" and "consumer," but as equal, innovation-driven partners.

This synergy emerges at the intersection of:

1. **The EU's pressing needs** for cutting-edge digital solutions and secure, sovereign technologies;
2. **Ukraine's proven capabilities** in advanced tech domains, from AI and cybersecurity to Industry 4.0 solutions, developed under high-pressure, real-world conditions; and
3. The clear and sustained **interest of EU industries in co-developing, co-investing, and innovating alongside Ukrainian companies.**

This is not a one-way value chain but a two-way innovation corridor. Ukrainian expertise offers the EU robust, scalable solutions to strengthen its digital sovereignty and competitiveness, while European partners provide Ukraine with expanded market access, investment capital, and integration into the Single Digital Market. Together, they form a complementary ecosystem where joint R&D, technology transfer, and cross-border projects can flourish, addressing shared challenges and opening new frontiers in the digital economy.

5. FORESIGHT STUDY FINDINGS

5.1. Methodology

The study employed a structured foresight methodology to explore **potential scenarios for EU-Ukraine digital cooperation in a 5-10 year horizon.** The approach was based on a **2x2 scenario analysis framework**, utilizing two critical uncertainties as **the primary axes:**

- **X-Axis:** Level of EU-Ukraine political and institutional integration, ranging from HIGH (accelerated accession, harmonised regulations, open markets) to LOW (delayed accession, fragmented alignment, persistent barriers).
- **Y-Axis:** Speed of technological transformation and adoption, ranging from FAST (rapid uptake of emerging technologies like AI, defence tech, and green tech) to SLOW (conservative markets, cautious regulation, limited innovation funding).

Figure 22: 2x2 scenario analysis framework
"Potential scenarios for Ukraine-EU digital cooperation in a 5-10 year horizon"

Insights regarding these scenarios were generated through a collaborative international workshop that took place on September 23, 33 involving expert stakeholders from Ukraine and 10 EU Member States.

5.2. Scenario Analysis

Scenario A: "European DigitalSovereignty Acceleration" *(High Integration & Fast Adoption)*

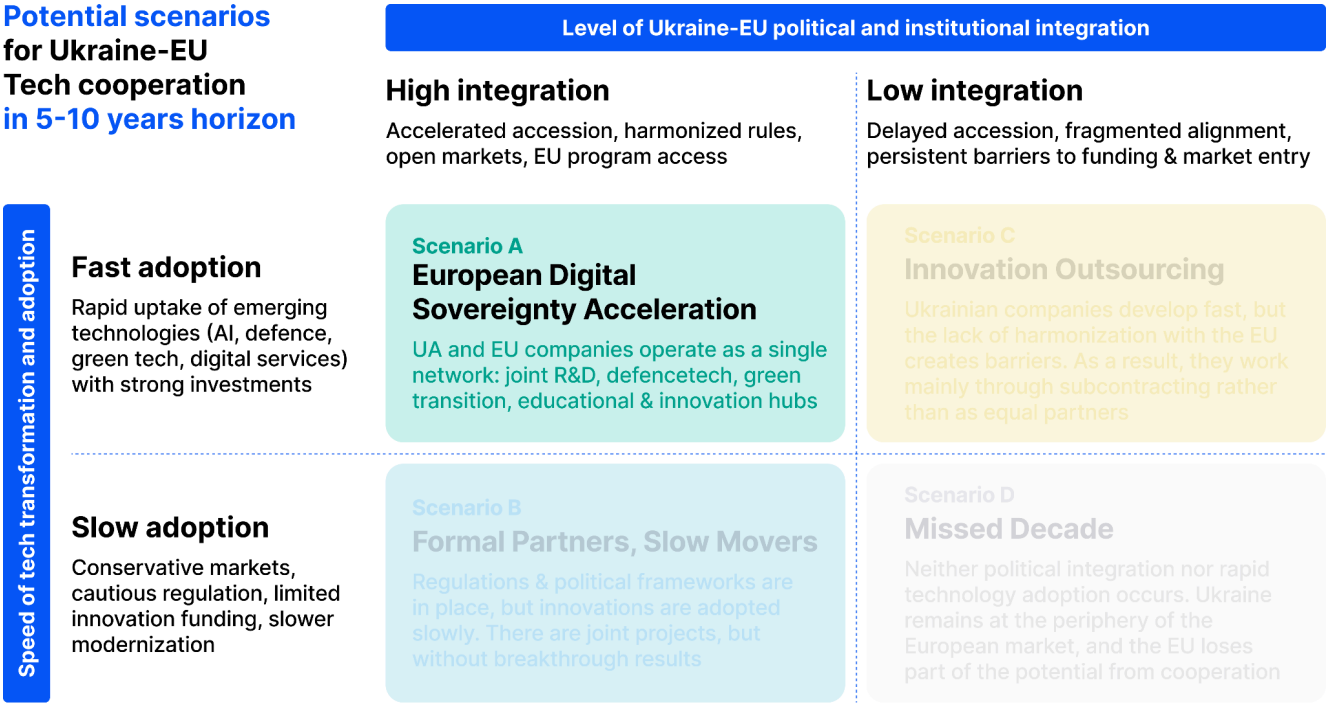

Figure 23: Scenario A "European DigitalSovereignty Acceleration"

Overview: Ukraine and the EU function as a unified digital ecosystem. Companies collaborate across borders on R&D, defence tech, the green transition, and innovation hubs. Markets are harmonised, trade barriers removed, business networks interconnected, supported by strong EU investment and open access to markets.

Key Dynamics:

- ☑ Stable geopolitical environment, end of war.
- ☑ Fully integrated markets with aligned regulations.
- ☑ Active networks of business clusters and support organisations.
- ☑ Two-way exchange of talent, IP, and opportunities.
- ☑ Strong EU investment and corporate expansion into Ukraine.

Opportunities:

- ☑ Joint adoption of advanced and green technologies, including MilitaryTech.
- ☑ Strengthened global competitiveness and market access beyond the EU.
- ☑ Co-development of resilience and strategic sovereignty.
- ☑ Shift from project-based to long-term industrial partnerships.

Risks:

- ☑ Market dominance by multinationals, limiting SME growth.
- ☑ High regulatory pressure on Ukrainian firms.
- ☑ IT talent migration from Ukraine to the EU.
- ☑ Economic strain from rapid tax and price harmonization.

Recommended Actions:

- ☑ Create special economic zones or transition mechanisms for Ukrainian companies.
- ☑ Scale Ukrainian digital governance models (e.g., Diia.City) across the EU.
- ☑ Launch large EU-Ukraine R&D and innovation programmes.

Early Signals:

- ☑ Ukrainian eligibility in EU R&D, defence, and innovation programmes.
- ☑ Growth in EU investments, M&A activity, and R&D offices in Ukraine.
- ☑ Rising exports of Ukrainian IT and defence technologies to the EU.

Conclusion: Scenario A, "European DigitalSovereignty Acceleration," envisions the most ambitious and mutually beneficial path for Ukraine-EU cooperation — one where integration fuels innovation, competitiveness, and resilience. Achieving it will require strategic alignment, sustained investment, and deliberate action to ensure balanced growth and prevent inequality within this shared digital ecosystem.

Scenario B: "Formal Partners, Slow Movers" (Inertial Scenario) *(High Integration & Slow Adoption)*

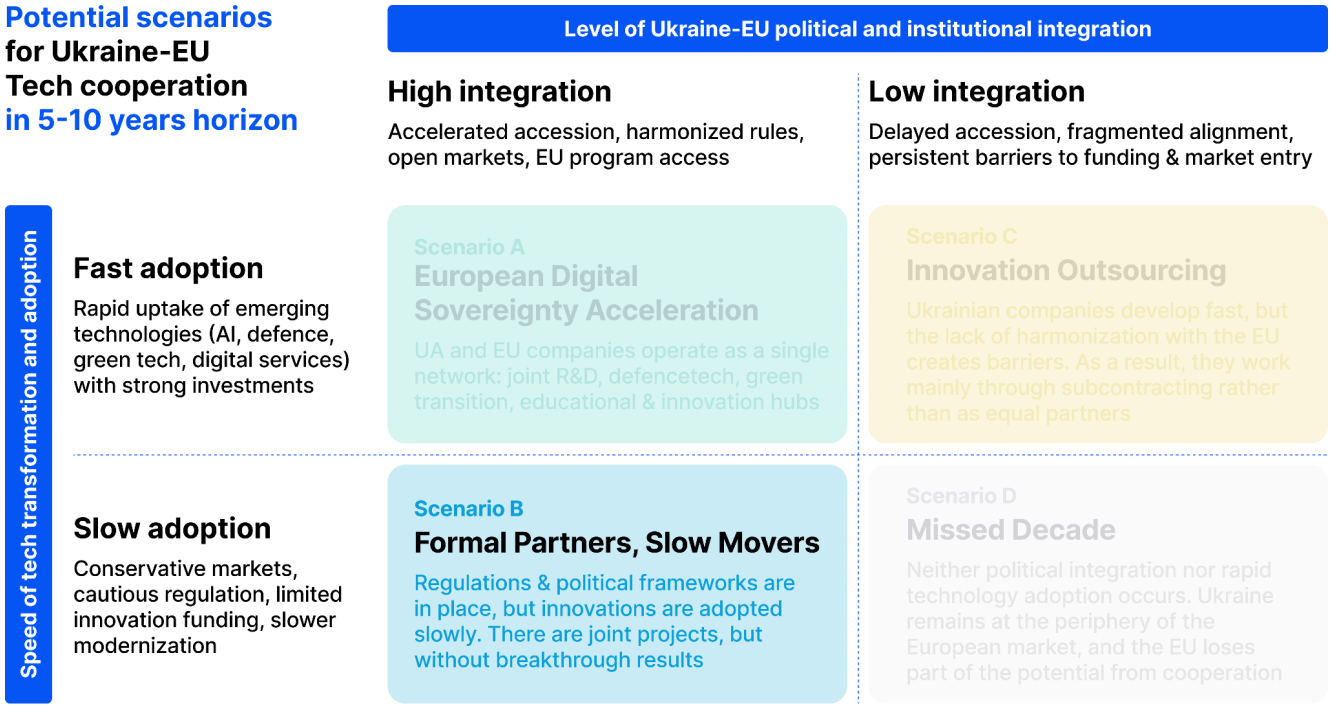

Figure 24: Scenario B "Formal Partners, Slow Movers"

Overview: Ukraine and the EU have political and regulatory frameworks in place for cooperation, creating a foundation for cross-border projects and technology adoption. However, bureaucratic inertia and conservative market behavior slow progress, limiting breakthrough innovation.

Key Dynamics:

- ☑ Regulations aligned on paper, but implementation is slow.
- ☑ Investment favors traditional infrastructure over high-tech innovation.
- ☑ Talent migration reduces Ukraine's innovation capacity.
- ☑ EU regulatory pace limits regional innovation potential.

Opportunities:

- ☑ EU cohesion funds support economic stability.
- ☑ Participation in EU programmes (Horizon Europe, SMP) enables engagement.

Risks:

- ☑ Lagging competitiveness vs. agile global regions.
- ☑ Delays in adapting to complex EU digital regulations (e.g., the AI Act).
- ☑ Intense Single Market competition without strategic partnerships.

Recommended Actions:

- ☑ Align regional and national strategies (e.g., RIS3) for a common framework.
- ☑ Promote joint initiatives, study visits, and cluster collaborations to build trust.

Early Signals:

- ☑ Cooperation remains fragmented despite aligned policies.
- ☑ Misallocated investments due to bureaucracy.
- ☑ Slower growth in economic and innovation metrics.
- ☑ Rising fines and regulatory non-compliance cases.

Conclusion: Scenario B, "Formal Partners, Slow Movers," demonstrates while Ukraine-EU cooperation frameworks exist, realizing their full potential requires targeted action to overcome bureaucratic and market barriers. Strategic alignment, focused investment, and practical collaboration between clusters and firms can transform these foundations into tangible innovation and economic growth.

Scenario C: "Innovation Outsourcing" *(Low Integration & Fast Adoption)*

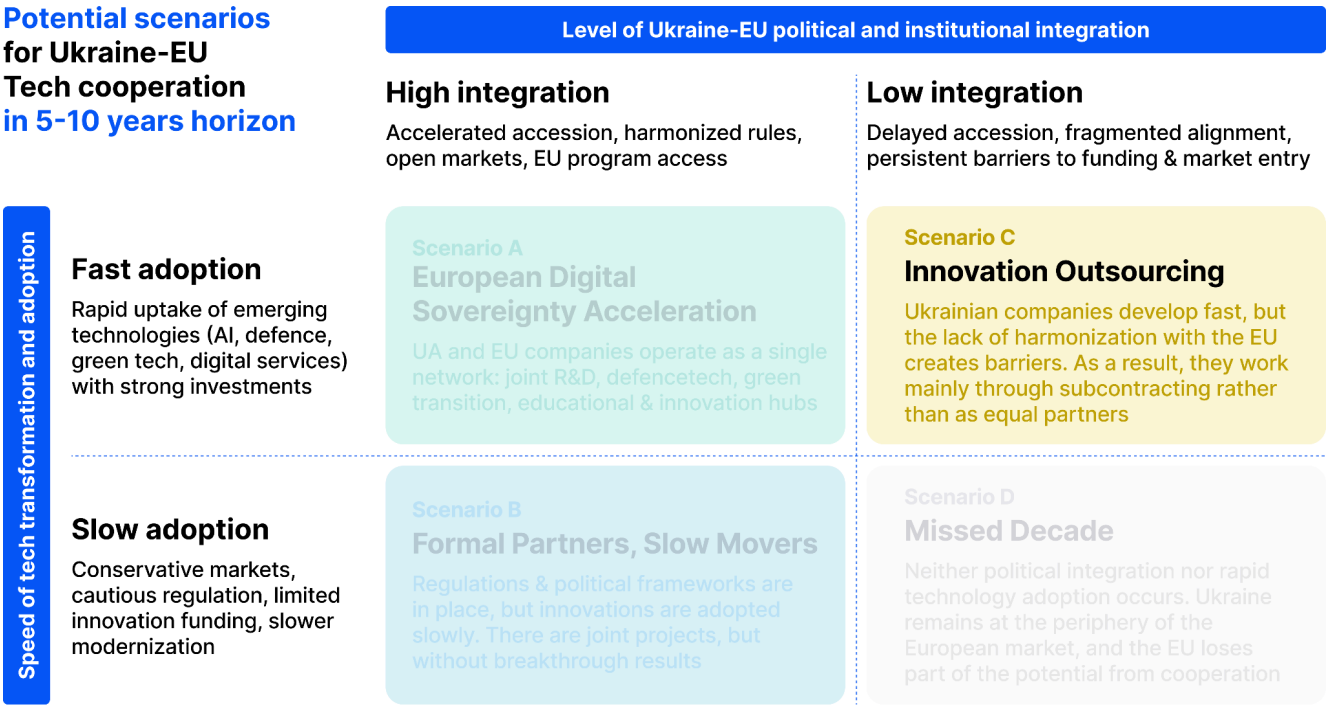

Figure 25: Scenario C "Innovation Outsourcing"

Overview: Ukrainian companies innovate rapidly in digital, IT, and advanced manufacturing, but lack of political and regulatory alignment with the EU keeps cooperation mostly transactional. Ukraine acts primarily as a

subcontractor, while its skilled workforce and niche expertise, including defence tech, make it an attractive hub for specialized services. Trade grows, but value largely flows to EU firms.

Key Dynamics:

- ☑ Strong domestic capabilities in digital, IT, and advanced manufacturing.
- ☑ Barriers from unharmonized standards, certifications, and legal frameworks.
- ☑ Trade mainly through service outsourcing to EU firms.

Opportunities:

- ☑ Skilled workforce meets EU service demand.
- ☑ Niche expertise in defence tech.
- ☑ Educational institutions provide a continuous talent supply.

Risks:

- ☑ Limited trust and political instability hinder long-term partnerships.
- ☑ Geopolitical and cultural differences create friction.
- ☑ Value creation captured mostly by EU firms.

Recommended Actions:

- ☑ Build a verified database of stakeholders and success stories.
- ☑ Map market dynamics and share insights nationally.
- ☑ Invest in reskilling to meet EU market needs.

Early Signals:

- ☑ EU funding mostly supports subcontracting roles.
- ☑ Growth in networking events linking Ukrainian providers and EU clients.
- ☑ Contracts and MoUs focus on service delivery, not joint R&D.

Conclusion: Scenario C, “Innovation Outsourcing,” shows fast adoption but low integration. Ukraine can excel as a service hub, yet strategic value requires trust-building, regulatory alignment, and deliberate investment to balance benefits and foster deeper partnerships.

Scenario D: "Missed Decade" *(Low Integration & Slow Adoption)*

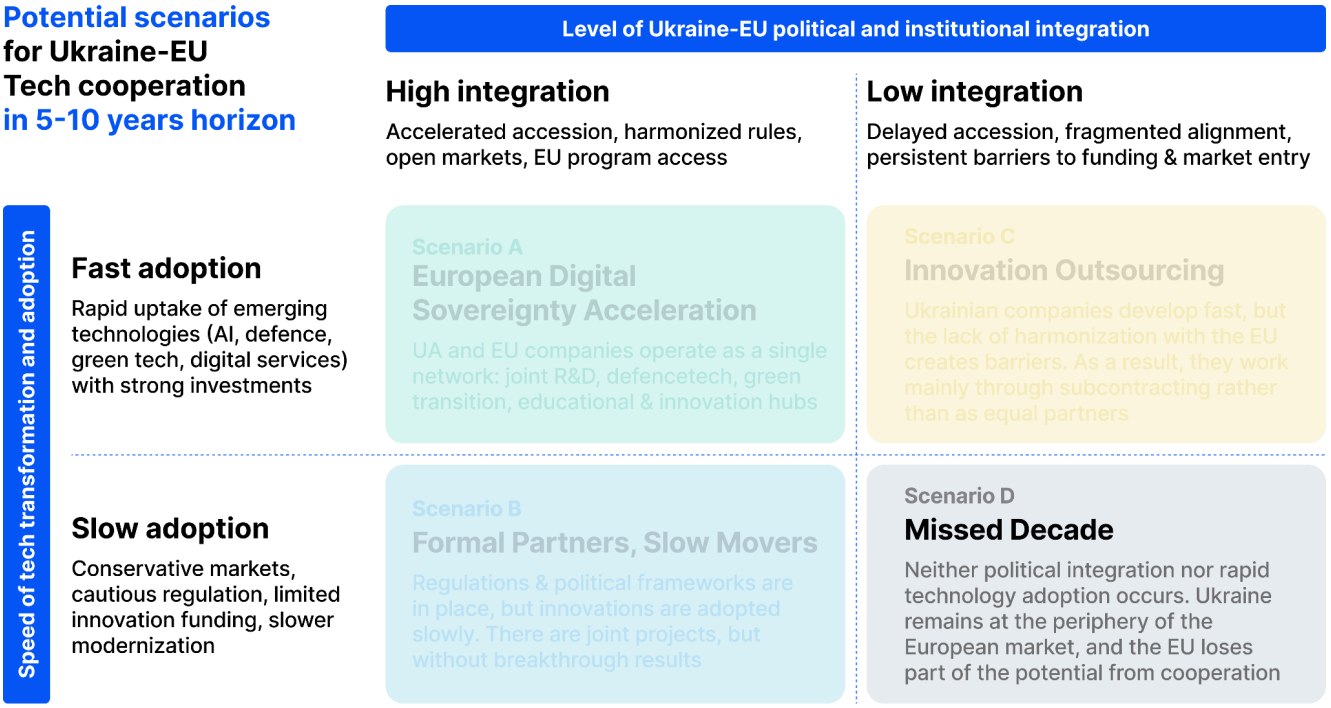

Figure 26: Scenario D "Missed Decade"

Overview: Ukrainian companies face significant challenges in digital, IT, and advanced manufacturing due to low political and regulatory alignment with the EU. Cooperation remains minimal and transactional. Infrastructure damage, ongoing conflict, and bureaucratic inertia further limit innovation. Ukraine's skilled workforce and niche expertise, including defence tech, remain largely untapped, while trade and value creation are minimal, flowing mainly to EU firms.

Key Dynamics:

- ☑ Protracted conflict and damaged infrastructure hinder economic and digital capacity.
- ☑ Shifts in EU political unity weaken support for integration.
- ☑ Bureaucracy on both sides stifles remaining cooperation momentum.

Opportunities:

- ☑ Ukraine's experience in resilience and defence innovation is a potential, underutilized asset.
- ☑ Flexible, alternative business models could emerge if targeted investment is secured.

Risks:

- ☑ Critical lack of investment blocks development and cooperation.
- ☑ Strategic losses for both the EU and Ukraine: missed innovation potential and weakened partnerships.
- ☑ Heightened geopolitical and security risks.
- ☑ Persistent perception of Ukraine as unstable deters business interest.

Recommended Actions:

- ☑ Promote and de-risk cooperation via joint ventures and public-private partnerships.
- ☑ Establish a joint Defence Innovation Center.
- ☑ Implement policy reforms to create a favorable environment for IT and cross-sector collaboration.

Early Signals:

- ☑ Decline in EU-Ukraine trade and foreign direct investment.
- ☑ Drop in higher education enrollment and completion rates.
- ☑ Exit of major international businesses from Ukraine.
- ☑ New economic or political barriers discouraging cooperation.

Conclusion: Scenario D, "Missed Decade," envisions a path of low integration and slow adoption. Ukraine's innovation potential risks being underutilized, while both the EU and Ukraine face strategic and economic losses. Overcoming these challenges requires targeted investment, policy reforms, and structured initiatives to stabilize cooperation and unlock latent capabilities.

5.3. Key Outcomes

The foresight study reveals both the prospects and the barriers of Ukraine-EU digital cooperation. Through an extensive discussion and voting process among the collaborative international workshop participants, **Scenario A "European DigitalSovereignty Acceleration"** was identified as **the most desirable** scenario, while **Scenario B "Formal Partners, Slow Movers"** was designated as **the inertial**, or "business-as-usual," scenario. This highlights **a critical insight:** while there is a strong aspiration for deep, synergistic integration from both Ukrainian and European stakeholders, **the current trajectory is likely to result in a slower partnership development. Nonetheless, there is significant development potential, actively realised through joint projects, grant initiatives, and collaborative programmes that continue to strengthen Ukraine-EU digital ties. To achieve the desired scenario, we must continue to foster and improve the conditions for cooperation, ensuring that both sides can accelerate integration and maximize mutual benefits.**

Development Opportunities of the Scenario A "European DigitalSovereignty Acceleration"

The study identified **significant opportunities** in a desirable Scenario A "European DigitalSovereignty Acceleration", including:

- **Co-creation of a Unified Digital Ecosystem:** Developing joint R&D programmes, innovation hubs, and educational initiatives to operate as a single network.
- **Strategic Sectoral Leadership:** Building joint capabilities in high-growth, strategic sectors such as defence tech, green transition technologies, and AI.
- **Enhanced Global Competitiveness:** Leveraging combined strengths to jointly access non-EU markets (e.g., US, UK) and enhance strategic sovereignty and resilience against external threats.
- **Mutual Economic Growth:** Creating new market opportunities for EU companies in Ukraine's reconstruction and for Ukrainian tech firms in the EU Single Market.

To stimulate this scenario, Ukraine and the EU should:

1. **Align regulations and standards:** Harmonise digital, cybersecurity, data, and e-signature regulations; establish joint interoperability standards and certification schemes.
2. **Launch joint R&D and innovation programmes:** Co-finance projects in defence tech, green transition, AI, and digital infrastructure with clear paths to market.
3. **Invest in shared digital infrastructure:** Expand high-speed connectivity, data centres, and cloud capacities to support a unified digital ecosystem.
4. **Develop multi-country pilot projects:** Implement "digital twin as a service" pilots in key sectors (energy, transport, reconstruction) to demonstrate scalability and ROI.
5. **Facilitate market access:** Introduce fast-track procedures for joint certification, public procurement, and mutual recognition of digital products.

6. **Support skills and talent mobility:** Create exchange programmes for engineers, researchers, and cluster managers to build common expertise.
7. **Ensure joint security and risk management:** Establish trusted-partner schemes and coordinated cybersecurity frameworks for shared platforms.
8. **Enable co-investment mechanisms:** Combine EU, Ukrainian, and private funding (Horizon Europe, EIB/EBRD, national funds) to sustain long-term collaboration.

Risks of the Scenario B "Formal Partners, Slow Movers"

The inertial Scenario B "Formal Partners, Slow Movers," presents **some risks**:

- **Lagging competitiveness vs. agile global regions:** Both Ukraine and the EU risk losing technological momentum compared to faster-moving global players due to bureaucratic processes, fragmented coordination, and slow decision-making.
- **Delays in adapting to complex EU digital regulations (e.g., the AI Act):** Slow harmonisation with EU rules may create barriers for Ukrainian businesses to access the Single Market and limit the EU's ability to integrate Ukraine into its digital ecosystem effectively. At the same time, technology regulations could create disadvantages for the EU in the AI-era.
- **Intense Single Market competition without strategic partnerships:** Ukrainian SMEs entering EU markets individually may face strong competition from established EU players, leading to limited integration and weak export outcomes.

To avoid this scenario, Ukraine and the EU should:

- **Accelerate cooperation mechanisms:** Simplify administrative procedures, introduce joint EU–Ukraine task forces, and pilot fast-track digital projects to enhance responsiveness and agility.
- **Strengthen regulatory alignment and capacity:** The EU should provide technical assistance and training on the AI Act, Data Act, and other key frameworks. Ukraine should establish clear roadmaps and national competence centres to support alignment and compliance.
- **Promote cluster and partnership-based integration:** Encourage joint consortia, co-innovation projects, and EU-Ukraine cluster cooperation to ensure fair competition, shared market access, and value chain integration.

6. CONCLUSIONS AND RECOMMENDATIONS

6.1. A Strategic Choice for a Shared Digital Future

The analysis presented in this report confirms that **the EU-Ukraine digital partnership is at a critical stage.** The “Golden Triangle of Opportunity”, the clear alignment between the EU’s strategic needs, Ukraine's proven capabilities, and mutual industry interest, offers a unique pathway to build a resilient, innovative, and globally competitive digital ecosystem. **The most promising areas for immediate, high-impact collaboration are Industry 4.0/5.0, AI & Machine Learning, and Cybersecurity.**

However, **the “Formal Partners, Slow Movers” scenario looms as a significant risk.** Without proactive and decisive action, bureaucratic inertia, a funding gap for Ukrainian SMEs, and unresolved operational barriers could lead to a superficial, transactional relationship. This would result in a missed opportunity for the EU to strengthen its digital sovereignty and for Ukraine to accelerate its economic recovery and modernization. **The choice is strategic: to default to a path of slow progress or to build a deeply integrated “European DigitalSovereignty Acceleration” scenario.**

6.2. Strategic Recommendations

To seize the opportunity and mitigate the risks, we propose the following actionable recommendations targeted at key stakeholder groups.

6.2.1. For EU and Ukrainian Policymakers

Launch a Targeted Financial Instrument for Ukrainian Tech SMEs: Address the "funding gap" by creating a dedicated EU-backed fund or guarantee facility that recognizes intangible assets (IP, contracts) as collateral. This will unlock growth capital for SMEs and startups beyond the current "ideal candidate" segment.

- ☐ **Establish a "Digital Talent Green Corridor"**
  Create a streamlined process for Ukrainian IT specialists to obtain short-term EU business travel permits for securing contracts and managing projects. Simultaneously, work with ENIC/NARIC centers to pilot a fast-track qualification recognition programme for Ukrainian tech professionals to reduce "brain waste."
- ☐ **Accelerate Regulatory Harmonization**
  Establish a joint EU-Ukraine task force to accelerate the harmonization of key digital regulations (e.g., GDPR, AI Act, NIS2). Providing clear roadmaps and technical assistance will reduce compliance costs for Ukrainian SMEs and build trust for seamless data flows.
- ☐ **Incentivize Substitution of Hostile Software**
  Develop a joint programme offering financial incentives and technical support for Ukrainian businesses to migrate from Russian-origin software (e.g., 1C, Bitrix) to EU or trusted open-source alternatives. This directly addresses a critical cybersecurity vulnerability.

6.2.2. For Business Support organisations and Clusters

- ☐ **Organize Strategic, Sector-Focused B2B Matchmaking**
  Shift from general networking events to curated matchmaking sessions focused on the Golden Triangle sectors (Industry 4.0/5.0, AI/ML, Cybersecurity). These events should bring together specific EU industrial players with pre-vetted Ukrainian tech companies.
- ☐ **Develop Joint EU-Ukraine Innovation and R&D Platforms**
  Use Horizon Europe and the Digital Europe Programme to establish joint R&D hubs or virtual platforms

for co-development in strategic areas like green tech, defence tech, and industrial robotics. This fosters true co-creation rather than subcontracting.

- [ ] **Build a "Trusted Partner" Database**
  Create and maintain a publicly accessible, verified database of Ukrainian IT companies and EU industrial firms, complete with case studies and certifications, to increase visibility and reduce perceived risks for new partnerships.

- [ ] **Strengthen Cluster Management Capacities**
  Implement "train-the-trainer" programmes where established EU clusters mentor Ukrainian counterparts on navigating EU funding, managing international projects, and providing advanced business support services.

6.2.3. For Businesses (SMEs and Enterprises)

- [ ] **Form Strategic Partnerships, Not Just Subcontracts**
  EU industrial firms should engage Ukrainian tech companies as co-development partners in complex projects, particularly in AI and Industry 4.0, to leverage their full innovation potential and build shared intellectual property.
- [ ] **Explore Joint Ventures for Ukraine's Industrial Modernization**
  EU technology and manufacturing companies should investigate joint ventures to implement Industry 4.0/5.0 solutions in Ukraine’s manufacturing, agriculture, and energy sectors. This addresses a critical dependency for Ukraine while creating a resilient, near-shore supply chain for the EU.
- [ ] **Prepare for EU Regulatory Compliance**
  Ukrainian IT companies aiming for the EU market must proactively invest in understanding and complying with key regulations like GDPR, the AI Act, and NIS2. This is no longer optional but a prerequisite for market entry and building trust.
- [ ] **Leverage Diia.City for Cross-Border Investment**
  EU investors and companies should utilize the legal and fiscal advantages of Diia.City to structure joint ventures, M&A deals, and other investment vehicles, benefiting from its transparent framework based on common law principles.

7. APPENDICES

7.1. Data Tables

Appendix 1

Classification of Economic Activities (CEA), used for the study data

Software development	
58.21	Publishing of computer games
58.29	Other software publishing
62.01	Computer programming activities
62.02	Computer consultancy activities
62.03	Computer facilities management activities
62.09	Other information technology and computer service activities
63.11	Data processing, hosting and related activities
63.12	Web portals
74.10	Specialised design activities

Hardware and system integrators	
28.99	Manufacture of other special-purpose machinery n.e.c.
46.51	Wholesale of computers, computer peripheral equipment and software
46.52	Wholesale of electronic and telecommunications equipment and parts
47.41	Retail sale of computers, peripheral units and software in specialised stores
95.11	Repair of computers and peripheral equipment
95.12	Repair of communication equipment
95.21	Repair of consumer electronics

Digital Marketing	
73.11	Advertising agencies
73.12	Media representation (advertising placement services)

Telecommunications	
61.10	Wired telecommunications activities
61.20	Wireless telecommunications activities
61.30	Satellite telecommunications activities
61.90	Other telecommunications activities

R&D	
72.11	Research and experimental development on biotechnology
72.19	Other research and experimental development on natural sciences and engineering
72.20	Research and experimental development on social sciences and humanities

7.2. Case Studies

Appendix 2

Case examples from Ukrainian IT companies success stories

Finance & Banking

Cleveroad: Accelerating Cloud Growth for Nasdaq-Listed Company through DevOps Augmentation

The client, Penneo A/S, a Nasdaq-listed RegTech company, sought to scale its AWS-based infrastructure for expanding KYC and e-signature services. Cleveroad, an AWS Certified Partner, provided DevOps expertise utilizing Cloud, Edge & Fog Computing and Enterprise Process Automation to enhance cloud performance, automate CI/CD pipelines, and strengthen security. The collaboration streamlined infrastructure management, improved deployment reliability, and significantly boosted the platform's scalability and efficiency.

References: https://www.youtube.com/watch?v=bzN4hpGdjsc
https://www.cleveroad.com/blog/case-study-devops-staff-augmentation-for-penneo/

Cleveroad: Long-Term FinTech Partnership for Secure Payment Platform Development

Cleveroad partnered with a leading European FinTech company in Luxembourg to provide an expert engineering team for enhancing existing payment infrastructure and building new secure products using Web Platforms & Applications. The collaboration focused on compliance with KYC and AML regulations and supporting multi-currency transactions, incorporating Blockchain & Distributed Ledger, Cloud, Edge & Fog Computing, and Cybersecurity. Cleveroad's specialists helped launch high-quality, scalable FinTech solutions on time.1

References: https://www.youtube.com/watch?v=_vKrnPcQVpY

Baltum Bureau: Cybersecurity Certification for IT Companies: The Path to EU and US Markets

Baltum Bureau assisted a FinTech client (covering Germany, Estonia, and Portugal) in implementing an information security management system compliant with ISO/IEC 27001 and GDPR. The project focused on Cybersecurity (with supplementary AI & ML components) and included an audit, building security policies, team training, and preparing the company for international certification. The successful outcome was the achievement of the ISO 27001 certificate, enabling access to European banking partners and market expansion across the EU.

Artjoker: Scaling Customer Support with AI: 100K+ Requests Monthly, With No Extra Staff

MyCredit, a major loan provider in Ukraine, needed to manage a high volume of customer requests without increasing staff. Artjoker built an AI-powered support system, including a chatbot, voice bot, and QA automation, powered by AI & ML and supporting technologies like Big Data & Analytics, Cloud, Edge & Fog Computing, Enterprise Process Automation, and Web Platforms & Applications. This system now handles over 100,000 requests monthly, resulting in 100% QA coverage, faster resolutions, lower costs, and improved customer satisfaction, transforming support into a growth driver.

References: https://artjoker.net/case-studies/ai-solutions/mycredit-ai/

Artjoker: AI Call Center Solution: 10× Faster Call Reviews with 95%+ Accuracy

For a major Customer Support Center in Mexico, Artjoker developed an AI-powered call evaluation system using AI & ML (along with Big Data & Analytics, Cloud, Edge & Fog Computing, Enterprise Process Automation, and Web Platforms & Applications) that automatically transcribes, analyzes, and scores calls. The system

achieved 10x faster reviews, a 40% reduction in infrastructure costs, and over 95% scoring consistency, enabling real-time QA and allowing supervisors to focus on coaching rather than manual review.1

References: https://artjoker.net/case-studies/ai-solutions/mexico-callchecker/

Artjoker: Cutting AWS Costs and Boosting Cloud Efficiency for Leading Fintech Platform

Lonvest, a fast-growing FinTech investment platform in Croatia, faced rising AWS costs and infrastructure inefficiencies. Artjoker conducted a full AWS audit, utilizing Cloud, Edge & Fog Computing (supported by Big Data & Analytics, Enterprise Process Automation, and Web Platforms & Applications), and optimized resources through right-sizing, automation, and reserved instances. The result was significantly lower cloud costs, improved scalability, and faster performance. The project established AWS best practices and long-term cost efficiency.

References: https://artjoker.net/case-studies/devops/lonvest-devops/

Artjoker: DevOps Automation for Leading Fintech Platform — 320% Performance Boost

Artjoker helped a German crypto platform (NDA client) automate infrastructure setup and streamline deployments using Enterprise Process Automation and DevOps tools like Terraform, AWS, and GitLab CI/CD (supported by Big Data & Analytics, Cloud, Edge & Fog Computing, and Web Platforms & Applications). The results included a 320% performance increase, 50x faster deployments, and improved security and scalability by adopting an infrastructure-as-code and serverless approach. This ensured compliance and built a flexible, future-ready system.

References: https://artjoker.net/case-studies/devops/cryptoplatform-devops/

Education & Training

Cleveroad: Multi-functional Digital Educational Platform for DJs

For Crossfader in the United Kingdom, Cleveroad developed a multi-functional educational platform for DJs, centered on Web Platforms & Applications. This solution replaced a limited WordPress system, combining a modern web app, native iOS application, and custom Admin panel. The new platform enabled subscription-based access to premium lessons and successfully migrated all existing users, leading to SEO results, audience expansion, increased profitability, and reduced operational costs.1

References:
https://www.cleveroad.com/portfolio/crossfader/,(https://www.youtube.com/watch?v=m7j5hnKRNy8

GolTeens: AI Creator: The First Ukrainian Course Teaching Teens to Create Full-Fledged AI Projects from Scratch

GolTeens, Ukraine, launched AI Creator, the first multidisciplinary course for teenagers (10–15 years old) that teaches digital project creation using AI & ML. Instead of separate training, students gain skills in copywriting, design, and programming simultaneously over nine months, during which they create five real AI projects, empowering them as creative authors from conception to implementation.

References: https://ai-creator.goiteens.com

Raccoon Gang: Customized Adaptive Learning Platform for the University of Southern Denmark

The University of Southern Denmark needed a personalized learning platform for its diverse international student base. Raccoon Gang engineered a custom, AI-powered, predictive learning Open edX LMS for over 27,000 students using Web Platforms & Applications, supported by AI & ML and Cloud, Edge & Fog Computing. Features included adaptive algorithms, personalized content paths, gamification, and LTI video integration, ensuring each student receives a tailored learning experience based on individual progress.1

References: https://raccoongang.com/case-studies/customized-adaptive-lms-for-university/

Raccoon Gang: Transforming EBRD Policy Academy: From Seminars to Global E-Learning Platform

The European Bank for Reconstruction and Development (EBRD) needed to digitize Policy Academy content for thousands of multinational learners. The solution utilized Web Platforms & Applications to deliver full instructional design, Open edX LMS deployment on Azure, multi-format content adaptation, GDPR-compliant hosting, and gamification. The result was enhanced knowledge accessibility with a secure and engaging learning experience for staff and external stakeholders.

Raccoon Gang: Success Story of NASA's Open Science 101 Curriculum

Raccoon Gang was challenged to create NASA's Open Science 101 curriculum for over 20,000 researchers in three months. The solution involved designing five interactive modules using Rise 360 and integrating them with the branded Open edX platform via SCORM, using Web Platforms & Applications. The curriculum featured sequential progression and gamification through Credly and RG Analytics for tracking, resulting in a comprehensive, on-demand curriculum for the global scientific community.

References: https://raccoongang.com/case-studies/instructional-design-services-for-nasa-open-science/

Raccoon Gang: Axim Collaborative and Raccoon Gang's Partnership. Innovative Solutions for the Open edX Platform

For Axim Collaborative (a Harvard-MIT initiative) in the USA, Raccoon Gang delivered five strategic projects to modernize the global Open edX platform using Web Platforms & Applications. These included verifiable digital credentials with Credly integration, a new mobile app with offline mode and SSO, a React.js video player design, a GA4 upgrade, and UI/UX enhancements. This transformed credential sharing, modernized the mobile learning experience, and enhanced platform analytics for millions of global users.

References: https://raccoongang.com/case-studies/raccoon-gang-axim-collaborative/

Raccoon Gang: LMS Migration and Customization With The Open edX® Platform for 20,000 Users

Asociatia Techsoup, Romania's major training provider, needed to migrate from two separate WordPress platforms to a scalable Open edX LMS, using Web Platforms & Applications. The project included complete data and progress reports migration for over 20,000 users, custom Romanian localization, automated reporting via RG Analytics, and AWS hosting. The results eliminated manual processes, reduced costs, and enhanced learning with peer reviews and discussions.

References: https://raccoongang.com/case-studies/lms-migration-open-edx-asociatia-techsoup/

Raccoon Gang: Migrating ChallengeU's Online Learning Platform

ChallengeU in Canada, serving over 10,000 students annually, migrated its platform to Open edX to reduce maintenance costs, which consumed 60-70% of tech resources. Raccoon Gang executed the migration to Open edX, preserving proven instructional design features, including diagnostic tests and a reusable content

library, using Web Platforms & Applications. The solution maintained a seamless user experience while significantly reducing maintenance overhead.1

References: https://raccoongang.com/case-studies/open-edx-platform-migration-for-challengeu/

Retail & E-commerce

CHM software: POS-Solution for Retail, HoReCa, and Services — Automate Your Business with CHM

For the client ČEKIS in Lithuania, whose business growth was limited by obsolete POS systems, CHM software (PayKit) implemented a localized, next-generation POS solution using Web Platforms & Applications and Cloud, Edge & Fog Computing. The system was compliant with state requirements and launched in six months, resulting in over 1,500 installations across Lithuania and key partnerships with major banks Luminor and Swedbank.1

References: https://cekis.lt/

Cleveroad: Development of a Digital B2B Marketplace Platform for On-Demand Professional Services

Cleveroad rebuilt a low-quality prototype for DGTL Ventures in Switzerland into a secure, scalable web solution (MVP) for a B2B marketplace. This platform, utilizing Web Platforms & Applications, connects independent professionals with service businesses. Cleveroad delivered an optimized UI/UX and integrated payments, authentication, and marketing tools, accelerating the client's launch and improving platform performance.

References: https://www.youtube.com/watch?v=Y35-FabQ640

Healthcare & Pharmaceuticals

Cleveroad: Innovative Health Management Platform Enabling Web and Mobile Data Synchronization

Cleveroad developed a custom health monitoring web platform for OptimallyMe in the United Kingdom using Web Platforms & Applications, supported by Big Data & Analytics, Cloud, Edge & Fog Computing, and Cybersecurity. The platform allows users to track and manage wellness data efficiently, featuring a Node.js backend, React.js frontend, and full cross-platform synchronization via Flutter, enhancing usability and performance.

References: https://clutch.co/go-to-review/6b034f73-5ac1-4f6b-a88e-20b3883e6dc7/192643

Cleveroad: BioManager Modernization of Legacy Biometric Systems

For TBS AG in Switzerland, Cleveroad modernized the BioManager solution for managing biometric systems. The project reengineered the legacy PHP-based backend into a modern JavaScript environment and implemented a redesigned, responsive UI using Web Platforms & Applications. The team developed new APIs, optimized data processing, and introduced modular architecture, significantly improving performance, usability, and maintainability.

References: https://clutch.co/go-to-review/6b034f73-5ac1-4f6b-a88e-20b3883e6dc7/100600

Hospitality & Tourism

Cleveroad: Hospitality SaaS Platform Modernization for European Enterprises

Cleveroad conducted a full technical audit to stabilize and optimize a Hospitality SaaS platform used by European enterprises in Sweden. The core technology utilized was Web Platforms & Applications with support from Cloud, Edge & Fog Computing. The team resolved recurring performance issues, improved code quality, and implemented a scalable architecture, including UI modernization and enhanced security with Azure AD B2C authentication. Measurable results included a 40% bug reduction and 38% faster page load time.

References: https://clutch.co/go-to-review/6b034f73-5ac1-4f6b-a88e-20b3883e6dc7/326628

Energy & Utilities

Cleveroad: Empowering Energy IoT Platforms with Advanced Gateway Control and Monitoring Tools

A European energy technology company in Ireland partnered with Cleveroad to enhance its industrial IoT platform for managing distributed devices and sensors. The solution heavily relied on IoT & Embedded Systems, supported by Cloud, Edge & Fog Computing, Enterprise Process Automation, and Web Platforms & Applications. Engineers improved the admin console by extending gateway control features, automating workflows, and enabling multi-channel notifications, resulting in a more scalable, reliable, and easily configurable system.

References: https://clutch.co/go-to-review/6b034f73-5ac1-4f6b-a88e-20b3883e6dc7/327058

Media & Entertainment

Cleveroad: Modernization of a Nordic Video-on-Demand Platform for a Leading Streaming Provider

Cleveroad partnered with Blockbuster (Denmark), a leading Nordic video provider, to modernize its legacy rental model into a scalable video-on-demand platform using Web Platforms & Applications and Big Data & Analytics. The team rebuilt Android and iOS apps, created web and TV versions, and migrated infrastructure to AWS CloudFront. The solution enabled pay-per-view functionality, improved UX, and reduced maintenance costs by 50% across Denmark, Sweden, and Finland.

References: https://www.youtube.com/watch?v=psAb2bL5iWQ
https://www.cleveroad.com/portfolio/blockbuster/

Manufacturing & Industry 4.0/5.0

ПП НВФ «Українська вагова компанія» (Ukrainian Scale Company): Automobile Scales with IoT Technology

This project, executed for TopWeigh Europe (England, Netherlands), involved transitioning from a manual to a fully automated weighing process for cargo vehicles. The solution utilizes IoT & Embedded Systems, supported by AI & ML and Enterprise Process Automation. The resulting system provides logisticians and owners with instant access to the results.

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