

ARTIFICIAL INTELLIGENCE STARTUP ECOSYSTEM OF TÜRKİYE: OPPORTUNITIES AND CHALLENGES

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Abstract

This chapter examines the current artificial intelligence (AI) startup ecosystem in Türkiye, highlighting its strategic, institutional, and economic dimensions. Drawing on national policy documents and international indices, including the OECD Entrepreneurial Ecosystem Diagnostics (OECD, 2024) and the WIPO Global Innovation Index (WIPO, 2024), it finds that Türkiye exhibits strong entrepreneurial dynamism, supported by a young, digitally skilled population and an expanding innovation capacity. However, persistent challenges remain regarding organizational maturity, commercialization of Research and Development (R&D) outputs, and talent retention. The chapter further discusses key initiatives such as the National Artificial Intelligence Strategy (2021-2025) and the AI Startup Factory (YZF), an institutional accelerator model that connects startups with capital, mentorship, and access to international markets. Finally, it analyzes selected cases, including Vispera, Novus, and Text2Test, to illustrate the evolving dynamics of AI-driven innovation in Türkiye and the country's potential to transition from a "high potential, low maturity" structure to a scalable, globally competitive ecosystem.

Keywords

Artificial Intelligence, Entrepreneurship Ecosystem, Innovation, Venture Capital, Türkiye

Introduction

Artificial intelligence (AI) technologies have undergone profound evolution, tracing their origins to Alan Turing's foundational machine learning concepts in the 1950s and culminating in a transformative era post-2020, marked by the emergence of large language models (LLMs) developed by leading institutions such as OpenAI and Google. Contemporary AI encompasses multimodal systems that integrate textual, auditory, and visual data, thereby substantially expanding both the research landscape and industrial applications (Stanford University, 2025; Ministry of Industry and Technology, 2021).

Over the past decade, AI has assumed a central role in global technological and economic transformation. According to Stanford University (2025), the latest available data indicate that global AI investments, targeting AI technologies and startups, reached \$131.5 billion in 2024, representing 35% of total venture capital (VC) funding worldwide. This figure reflects the specific subset of VC devoted to AI, rather than all-sector venture capital. The rapid growth is reshaping not only technological production but also business models, decision-making processes, and the dynamics of innovation ecosystems.

Türkiye's economic transformation reflects these global AI trends. In 2021, the National Artificial Intelligence Strategy outlined the development of human capital, the establishment of ethical and legal frameworks, the advancement of research and development (R&D), and international cooperation (Ministry of Industry and Technology, 2021). Subsequently, the National Technology Entrepreneurship Strategy (Ministry of Industry and Technology, 2022) and Turcorn 100 Program (Ministry of Industry and Technology, 2025) focused on fostering international growth for technology startups.

Türkiye's AI startup ecosystem has evolved along complementary dimensions: the establishment of public policies and national strategies, and the dynamism of the private sector through institutional accelerators like Yapay Zekâ Fabrikası (AI Startup Factory, YZF). This framework positions Türkiye to become a regional innovation hub. Nonetheless, persistent challenges, including limited access to capital, weak university-industry collaborations, slow commercialization, and brain drain, continue to constrain maturity (OECD, 2024; WIPO, 2024).

This study examines Türkiye's AI startup ecosystem from a multidimensional perspective, focusing on the key strategic, institutional, and economic opportunities and challenges that shape its development. It further analyzes how national policies, investment patterns, and institutional accelerator models influence the ecosystem's transition toward global competitiveness.

1. Global Context of AI and Entrepreneurship

1.1. Rethinking What AI Can Do

The foundations of AI can be traced back to the early developments in algorithmic thinking, notably the work of Al-Khwarizmi in the 8th century, which established the conceptual basis for algorithms. In the 1950s, Alan Turing advanced these ideas by proposing that machines could “learn to learn,” thereby laying the groundwork for modern AI. The contemporary form of AI emerged around 2020, marked by the introduction of GPT-3 by OpenAI, which demonstrated the capacity to generate human-like text (Ministry of Industry and Technology, 2021). This development signaled a transition toward more autonomous AI systems capable not only of generating information but also of performing task-oriented actions, as ChatGPT exemplified.

Contemporary AI systems are increasingly multimodal, processing text, audio, images, and video. For instance, Google Gemini Live enables human-like dialogue, while Sora by OpenAI facilitates the generation of video content from textual inputs. These advancements significantly enhance user interaction by enabling more natural and immersive experiences. At the infrastructure level, the development of specialized chips and distributed cloud computing architectures has enabled the training and deployment of faster, larger-scale models for real-time analytics and scalability (Stanford University, 2025).

Parallel to these developments, advances in AI have improved intelligence and reasoning. LLMs have evolved beyond simple information retrieval toward increasingly sophisticated forms of decision-making. While GPT-3.5 demonstrated strong performance on tasks requiring high school-level reasoning, it exhibited limitations in abstract reasoning. More recent models, including GPT-4, OpenAI o1, and Google Gemini 2.0 Flash Thinking Mode, exhibit significantly enhanced cognitive capabilities, approaching aspects of advanced human reasoning. These improvements in reasoning have facilitated these models to work autonomously. Whereas in 2023, AI systems primarily functioned as support tools, such as operating as customer representatives, by 2025, they increasingly operate as independent agents (Stanford University, 2025).

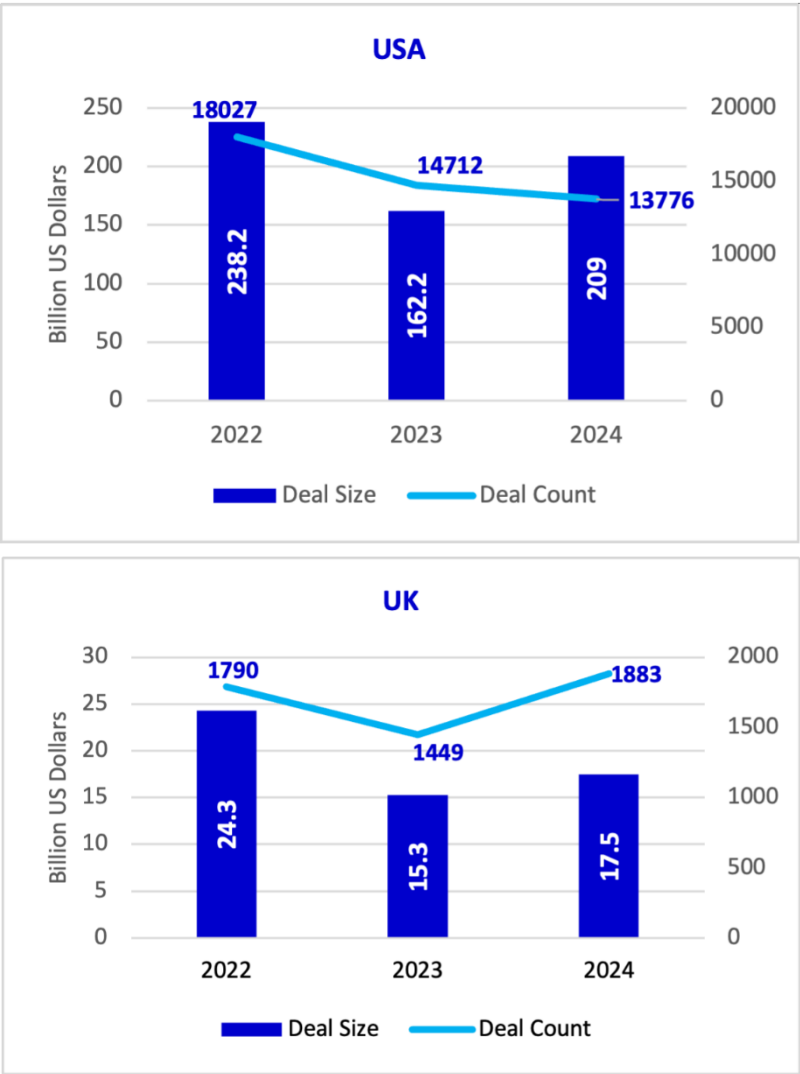
AI's role in scientific discovery is also expanding rapidly across multiple disciplines. In materials science, models such as CrystalLLM (Gruver et al., 2024) demonstrate the potential of AI-driven discovery, while in physics, PhysBERT (Hellert et al., 2024) contributes to advanced theoretical modeling. In quantum computing, systems such as AlphaQubit, developed by Google DeepMind and Google Quantum AI signal major progress (Google Quantum AI and Collaborators, 2025). The growing scientific impact of AI is further underscored by major academic recognitions: Demis Hassabis and John Jumper were awarded the 2024 Nobel Prize in Chemistry for their work on AlphaFold2 (NobelPrize.org, 2024a), while John Hopfield and Geoffrey Hinton received the 2024 Nobel Prize in Physics for their foundational contributions to neural networks (NobelPrize.org, 2024b).

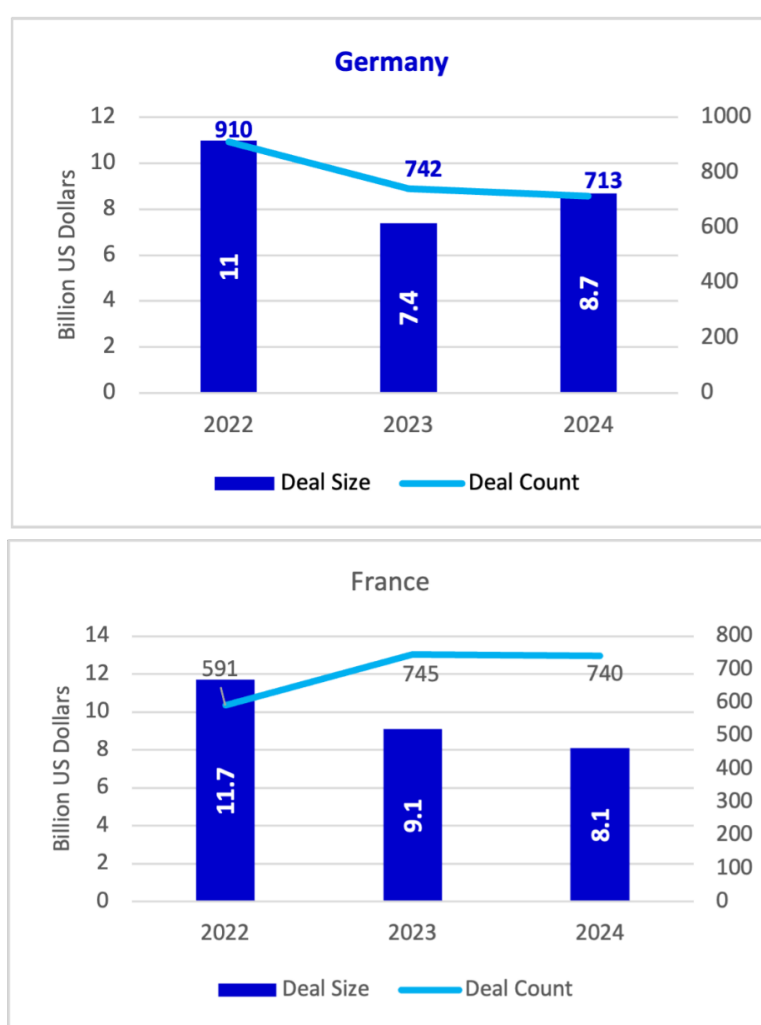
1.2. Global Startup Landscape

Despite ongoing economic uncertainty, global startup investment showed signs of recovery in 2024. The United States accounted for nearly half of the total global startup funding, reaching \$209 billion, while investment volumes in the United Kingdom, Germany, and France remained comparatively lower, attracting \$17.5 billion, \$8.7 billion, and \$8.1 billion, respectively (Startups.watch, 2024).

Figure 1

VC Deal Activity in Major Markets (2022–2024)





Source: Turkish Startup Ecosystem 2024 Year in Review Report January 16, 2025

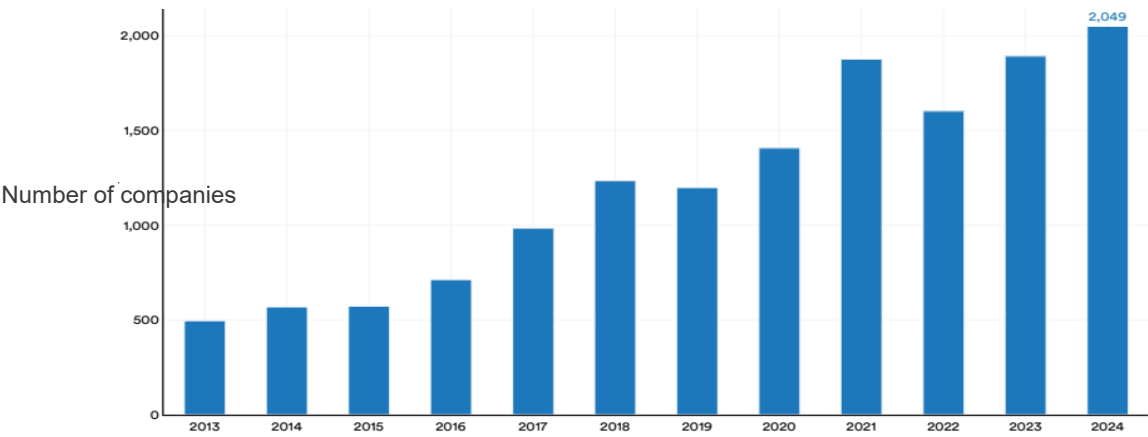
Global venture capital investments across all sectors grew by 7% to \$368 billion in 2024, despite a 6% decline in deal numbers to 35,685. Unlike the AI-specific figure above, this encompasses funding for startups and growth-stage companies in every industry, providing context for overall VC trends. The United States continues to dominate global venture capital activity. However, despite a decline in transaction volumes, average deal sizes have increased. In Europe, particularly in the United Kingdom and Germany, investment activity exhibited a moderate recovery following the downturn observed in 2023. In contrast, France experienced smaller investments. As illustrated in Figure 1, the macroeconomic uncertainty that intensified in 2022 appears to be gradually easing with capital inflows showing signs of recovery in 2024.

The year 2024 marked a significant milestone for investments in AI startups, with AI emerging as a dominant investment theme within the global startup ecosystem. Globally, a total of 26,960 investment deals were recorded in 2024 (CB Insights,

2024). Notably, AI-driven startups accounted for a substantial share, attracting 35% of total global venture capital investments (Barron’s, 2025). In total, venture capital funds allocated \$131.5 billion to 8,343 AI and machine learning startups in 2024 (PitchBook, 2024).

Total global startup investment reached \$252.3 billion in 2024, representing a 25.5% increase compared to 2023. This growth was driven primarily by private investments, which surged by 44.5%, while mergers and acquisitions (M&A) activity increased more moderately by 12.1%. These trends point to a broader recovery in capital flows across the startup ecosystem, extending beyond venture capital alone. Over the past decade, AI-related investments have increased nearly thirteenfold. In parallel, the number of newly funded AI companies rose to 2,049 in 2024, corresponding to an 8.4% year-over-year increase (Stanford University, 2025, reporting the latest available data for 2024). As illustrated in Figure 2, the period from 2013 to 2024 demonstrates a consistent upward trajectory in global AI investment.

Figure 2
Number of Newly Funded AI Companies in the World (2013-2024)



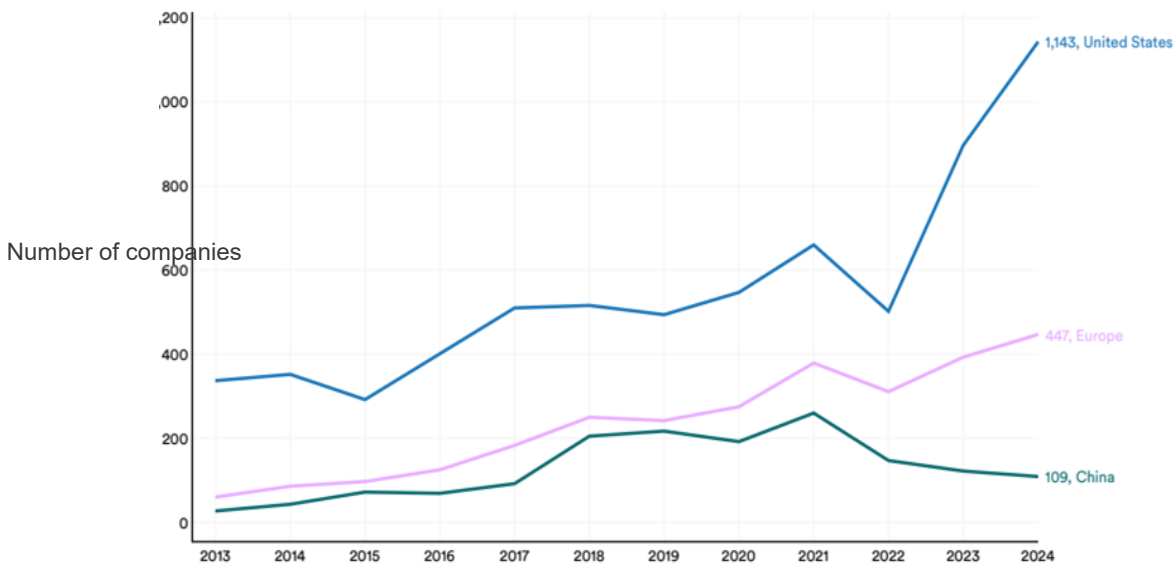
Source: Quid, 2024, Chart: 2025 AI Index Report

More than 90% of global AI investments have been directed toward AI-focused startups based in the United States and China (StartupCentrum, 2025). In 2024, startups in the United States attracted a total of \$209 billion in investment, of which 46% was allocated to AI-related ventures (Hu, 2025). That same year, private-sector AI investments in the U.S. reached \$109.1 billion—approximately twelve times greater than China’s \$9.3 billion and twenty-four times larger than the United Kingdom’s \$4.5 billion.

Generative AI demonstrated particularly strong momentum, attracting \$33.9 billion in private investment globally, an 18.7% increase from 2023 (Stanford University, 2025). This reflects a sustained trend in which the United States has consistently outperformed both Europe and China over the past decade. Since 2022, the number of newly established AI startups has grown significantly in both the United States and Europe, while China has experienced a decline for the second consecutive year (see Figure 3).

Figure 3

Number of Newly Funded AI Companies by Geographic Area (2013-2024)



Source: Quid, 2024, Chart: 2025 AI Index Report

The compound annual growth rate (CAGR) of the AI market for the period of 2025–2031 is estimated at 36.89%. By 2031, the total market size is projected to reach \$ 1.68 trillion (Statista, 2025).

1.3. Türkiye Startup Landscape

Over the past five years, the investment volume within the entrepreneurial ecosystem in Türkiye has grown substantially. In 2024, AI emerged as the second-largest sector in Türkiye in terms of total deal size, following Software as a Service (SaaS) in the amount of funding received (see Table 1).

Table 1

Investment Amounts in the 10 Sectors Receiving the Most Funding in Türkiye (2019-2024)

	SaaS	AI	Marketingtech	Grocery Delivery	Fintech	Gaming	Blockchain	Cybersecurity	IoT	Autotech
2019	\$5.8M	\$4.8M	\$1.7M	\$38.1M	\$4.3M	\$8.4M	\$0M	\$6.9M	\$1.5M	\$2.3M
2020	\$54.2M	\$43.3M	\$33.3M	\$0M	\$25.9M	\$20M	\$0.3M	\$0.4M	\$3.9M	\$3.2M
2021	\$10.7M	\$20.5M	\$2.7M	\$984.4M	\$68.9M	\$520M	\$39.7M	\$24.9M	\$6M	\$75.3M
2022	\$145.4M	\$152.7M	\$125.2M	\$768.2M	\$91.5M	\$113.3M	\$17.2M	\$14.3M	\$6.7M	\$37.8M
2023	\$44.3M	\$39.3M	\$4.8M	\$500.3M	\$30.7M	\$32.4M	\$5.3M	\$11.2M	\$9.3M	\$18.4M
2024	\$288.4M	\$277.5M	\$252.6M	\$250M	\$194.5M	\$125.3M	\$82.4M	\$72.6M	\$29.2M	\$28.7M

Source: Startups.watch Turkish Startup Ecosystem 2024 Year in Review Report

In 2022, a total of 38 AI startups in Türkiye received investment, increasing to 59 in 2023 (Startups.watch, 2024). By 2024, the number of funded AI startups had risen to 91, collectively attracting \$715.8 million in investment. This represented the highest sectoral investment volume within the Turkish startup ecosystem in 2024. Excluding BIGG (Individual Young Entrepreneur Program) investments, which primarily consist of government-supported early-stage funding, AI also recorded the highest number of investment transactions among all sectors. Of the 91 investment deals, 68 involved private-sector investors, highlighting the dominant role of private capital in supporting early-stage AI ventures. In terms of total funding volume, AI-related startups operating in the marketing and sales domain ranked first, driven largely by major investment rounds such as Insider's funding round (StartupCentrum, 2024).

According to Startups.watch (2025), the third quarter of 2025 was the strongest period of the year for early-stage venture capital investments across the broader Turkish startup ecosystem, while late-stage funding has remained relatively stagnant over the past two years (see Table 2). Compared with late-stage financing, securing early-stage investment in Türkiye is relatively more accessible, whereas mechanisms for growth-stage and late-stage funding remain limited. As a result, many startups pursue “flip-up” strategies, relocating or restructuring their headquarters abroad while maintaining operations in Türkiye to access international capital markets and growth-oriented venture funds.

Table 2
Türkiye Quarterly Deal Size and Count by Stages

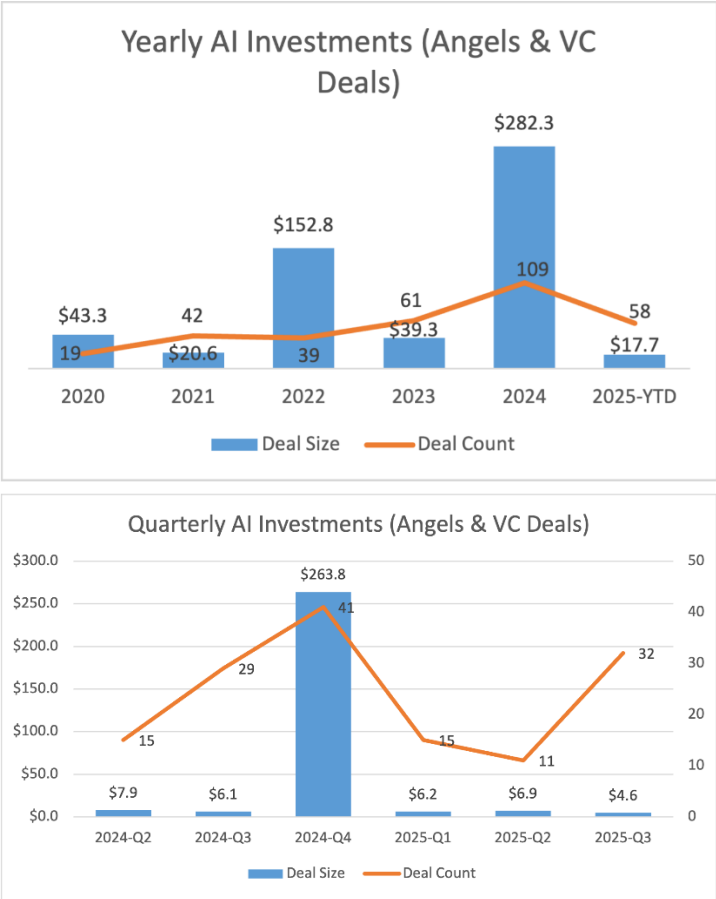
Türkiye Quarterly Deal Size Activity by Stages					
Stages	2024-Q3	2024-Q4	2025-Q1	2025-Q2	2025-Q3
Seed Stage (\$)	49M	37M	48M	39M	29M
YoY Growth		-26%	30%	-19%	-24%
Early VC Stage (\$)	32M	64M	15M	129M	157M
YoY Growth		101%	-76%	739%	22%
Later VC Stage (\$)	45M	250M	0M	0M	0M
YoY Growth			-100%		

Türkiye Quarterly Deal Count Activity by Stages					
Stages	2024-Q3	2024-Q4	2025-Q1	2025-Q2	2025-Q3
Seed Stage (#)	156	163	57	44	122
Seed Stage (#)	59	61	38	41	40
(BiGG Excluded)					
YoY Growth		3%	-38%	8%	-2%
Early VC Stage (#)	2	5	3	7	6
YoY Growth		150%	-40%	133%	-14%
Later VC Stage (#)	1	1	0	0	0
YoY Growth			-100%		

Source: Startups.watch Turkish Startup Ecosystem 2024 Year in Review Report

According to Startups.watch (2025), 32 AI startups in Türkiye raised \$4.6 million during the third quarter of 2025. Cumulatively, 58 AI startups secured a total of \$17.7 million during the first nine months of the year (see Figure 4).

Figure 4
Annual and Quarterly AI Investment Trends in Türkiye (2020–2025), Including Total Deal Size (USD Millions) and Deal Count (Angel and Venture Capital Transactions)



Source: Startups.watch Turkish Startup Ecosystem 2025 Q3 Report, October 7, 2025

2. National AI Policy and Institutional Framework

In 2021, the “National Artificial Intelligence Strategy 2021–2025” was formally introduced through the collaboration of the Presidency of the Republic of Türkiye’s Digital Transformation Office and the Ministry of Industry and Technology, with substantive contributions from a broad range of stakeholders. This initiative positioned Türkiye among the few countries worldwide to implement a comprehensive national AI strategy.

The AI Strategy was designed to achieve the following objectives:

- Developing experts with advanced skills in the field of AI and aligning the education system accordingly.

- Increasing R&D activities in AI, fostering entrepreneurship, and ensuring access to high-quality data and technical infrastructure.
- Establishing an appropriate ethical and legal framework for AI applications.
- Enhancing international cooperation in the AI domain.
- Managing the impact of AI on employment and professions.
- Transforming institutions and enterprises through the adoption of AI technologies (Ministry of Industry and Technology, 2021).

Additionally, the Ministry of Industry and Technology launched the “National Technology Entrepreneurship Strategy” in 2022 to accelerate technological entrepreneurship and strengthen the broader innovation ecosystem. One of its key outputs is the “Turcorn 100 Program” (Ministry of Industry and Technology, 2025), designed to accelerate the growth trajectories of high-potential technology startups by enabling rapid scaling and facilitating their expansion into global markets.

In parallel to these strategic initiatives, Turkish startups benefit from structured public funding mechanisms administrated by KOSGEB and TÜBİTAK. In 2024, 54 out of the 109 AI-related investment deals recorded in Türkiye were supported under TÜBİTAK’s BIGG (Individual Young Entrepreneur) program (see Table 3). The BIGG Fund significantly increased the number of deals in AI, health technologies, and biotechnology sectors, thereby strengthening the national innovation pipeline.

Table 3

The 6 Sectors Receiving the Most Funding in Türkiye by Deal Count (2019-2024)

Vertical	2021	2022	2023	2024	2025-YTD
Artificial Intelligence	42	39	61	109 (BIGG: 54)	60 (BIGG: 25)
Fintech	40	40	40	32	28
Gaming	54	30	50	27	24
Healthtech	23	28	19	60 (BIGG: 49)	24 (BIGG: 14)
SaaS	27	35	38	38	18
Biotech	10	8	8	76 (BIGG: 66)	17 (BIGG: 12)

Source: Startups.watch Turkish Startup Ecosystem 2025 Q3 Report, October 7, 2025

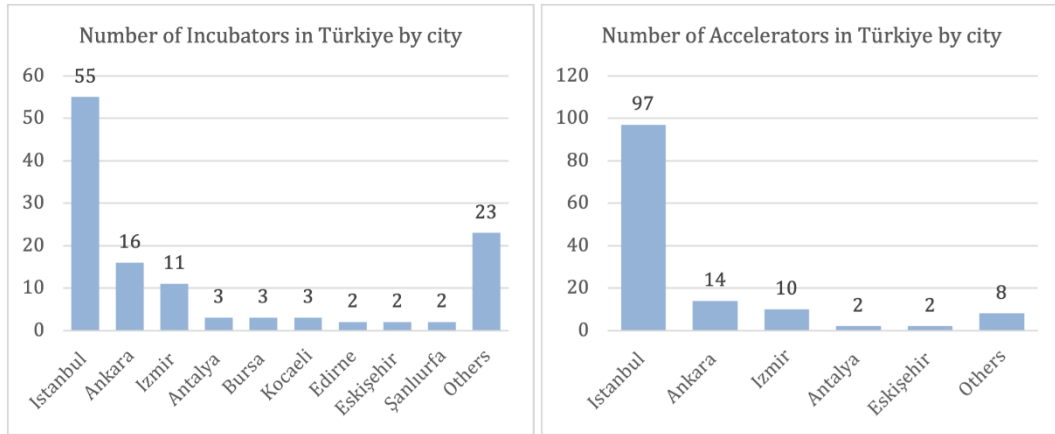
3. A Model in Türkiye's AI Ecosystem: AI Startup Factory (YZF)

Türkiye hosts a wide range of programs and incubation centers that support the development of its entrepreneurial ecosystem. According to data reported by Startups.watch, there are currently 120 active incubators and 133 accelerator programs operating across the country (see Figure 5).

The growing importance of accelerator programs and innovation intermediaries has been widely recognized in entrepreneurship literature. Accelerators contribute not only to startup financing but also to ecosystem development through mentorship, network formation, and knowledge diffusion (Cohen & Hochberg, 2014). Similarly, entrepreneurial ecosystems rely on coordinated interactions among entrepreneurs, investors, universities, corporations, and public institutions (Isenberg, 2011; Spigel, 2017).

Figure 5

Startup Ecosystem Program Türkiye: Incubators and Accelerators



Source: Startups.watch data, 2025

Among these structures, YZF occupies a notable position as Türkiye's first investment fund and accelerator program dedicated exclusively to AI. Established in 2023, YZF combines capital investment with a support framework. Beyond direct investment in AI startups domestically and internationally, YZF facilitates access to financial instruments, customer networks, and technical advisory services. These resources are channeled through İş Bankası and its affiliated entities.

The primary objective of YZF is to enable high-potential AI startups in Türkiye to achieve global competitiveness. To this end, the program extends beyond financial support, offering strategic support in areas such as business model design, investor relations, market analysis, corporate partnerships, and international expansion.

According to the most recent data published in YZF 2025, the YZF database comprises 2,877 AI startups spanning both Türkiye and the Turkish diaspora. Of these, 2,279 are based in Türkiye, 342 in the United States, 110 within the European Union, and 113 in the United Kingdom. This geographic distribution underscores Türkiye's emergence as an active player in global AI entrepreneurship, driven not only by its domestic ecosystem but also by diaspora networks and transnational collaboration networks.

To date, YZF has completed 37 investment transactions, establishing itself as the most active AI-focused fund in Türkiye. The Fund targets AI startups with at least one Turkish founder, operating across global markets, and serves as a connective node between entrepreneurs, the broader startup ecosystem, and corporate actors. In total, YZF has made direct investments in 33 startups while extending growth support to 55 ventures. Its portfolio reflects a pronounced international orientation: 16 startups are headquartered in the United States, 11 in Türkiye, and 4 in the United Kingdom, with further investments in Switzerland and Canada.

According to the 2025 Turkish Artificial Intelligence Ecosystem and Global Impact Report (Yapay Zekâ Fabrikası, 2025), YZF stands as the most active investor in the artificial intelligence domain in Türkiye during the 2024–2025 period, having completed 27 investments. The Fund distinguishes itself not merely in its capacity as an investor, but as a strategic catalyst that mobilizes the broader ecosystem, assuming a pivotal role in supporting ventures throughout their scaling processes and expansion into global markets. Furthermore, the Fund has demonstrated a pioneering influence in directing venture capital funds in Türkiye toward artificial intelligence investments.

Taken together, these indicators suggest that YZF has adopted a distinctly cross-border investment strategy, effectively integrating Türkiye's innovation capacity into global entrepreneurial networks and reinforcing its position as an emerging regional hub for AI-driven venture development.

3.1. AI Startup Factory–Backed Startups: Applied Success Cases

The startups supported by YZF constitute tangible outcomes of Türkiye's AI-based innovation capacity. To illustrate both the diversity and the varying levels of maturity within this ecosystem, this section examines three representative ventures operating across distinct technological domains: Vispera, Novus, and Text2Test.

3.1.1. Vispera: Computer Vision and Retail Analytics

Founded in 2014 in Istanbul, Vispera is a pioneering startup that develops image recognition–based shelf analytics solutions for the retail industry. Its AI-powered models enable real-time analysis of product availability, price label accuracy, and

planogram compliance on store shelves. Vispera's core strengths lie in digitizing retail operations through measurable performance metrics and in establishing a scalable international SaaS model. With a client portfolio of retail chains and manufacturers, the company now operates in 75 countries across five continents, having evolved into a global technology brand originating in Türkiye. This success underscores Türkiye's growing prominence and competitiveness in the development of AI-driven solutions.

3.1.2. Novus: Enterprise AI and Large Language Models

Founded in 2020 in the United States by Turkish entrepreneurs, Novus has developed an Agentic AI Framework designed to streamline the creation of enterprise-grade AI solutions. The platform enables organizations to build secure AI assistants and multi-agent systems across internal datasets in domains including finance, sales, customer support, and operations. Key functionalities, such as agent orchestration, creation and configuration, enterprise-level security, multi-model support, and customized workflows, allow companies to manage complex business processes with greater efficiency and precision. Novus demonstrates how Turkish-origin entrepreneurs can generate substantial global value through the export of digital talent. Furthermore, Novus's success highlights the role of diaspora-led ventures in strengthening Türkiye's innovation ecosystem by facilitating the transfer of knowledge, capital, and network resources.

3.1.3. Text2Test: Generative AI & Software Automation

Founded in 2024, Text2Test is an innovative startup that introduces a new standard for software testing through generative AI. It empowers non-technical users to generate end-to-end test scenarios from natural-language descriptions. This approach not only reduces the cost and complexity of software testing but also enables tests to be self-healing and continuously updatable. As one of Türkiye's earliest implementations of generative AI in B2B processes, Text2Test illustrates the rapid maturation of the country's technical innovation capacity.

The prevalence of startups headquartered in the United States and Europe demonstrates the global reach of Türkiye's entrepreneurial network. Diaspora-led ventures provide bidirectional value to Türkiye's ecosystem—both through international knowledge transfer and capital inflows. Concurrently, the industrial applications of AI within Türkiye are becoming increasingly tangible: Vispera advances computer vision, Novus develops agent-based AI frameworks, and Text2Test pioneers' generative approaches to test automation.

The trajectory of YZF further highlights the institutional mechanisms bridging early-stage acceleration with late-stage scaling, positioning Türkiye as an emerging regional hub for AI-driven innovation.

4. Opportunities and Challenges in Türkiye's Entrepreneurial Ecosystem

Türkiye's entrepreneurial ecosystem stands out for its robust rate of startup formation, a dynamic entrepreneurial culture, and an expanding innovation output. The OECD's Entrepreneurial Ecosystem Diagnostics Report (2024) highlights Türkiye's high firm birth rate (14%) and notable business renewal activity. Yet, despite these strengths, the country's startup density in capital-intensive sectors and its share of unicorns remain below the OECD average (OECD, 2024). Similarly, data from the WIPO Global Innovation Index (2024) indicate that Türkiye ranks 37th globally and is positioned among the top five countries within the upper-middle-income group (WIPO, 2024). Synthesizing these indicators, Türkiye's entrepreneurial landscape exhibits what may be termed a "high entrepreneurial energy – low institutional depth" paradox: while the country demonstrates considerable capacity and willingness to generate new ventures, the institutional, financial, and human capital infrastructure necessary to sustain and scale these enterprises remains under development.

4.1. Opportunities

Türkiye's AI startup ecosystem has entered a transformative phase in recent years, driven by national policy support and private-sector investment. The country benefits from substantial entrepreneurial potential, underpinned by a young and educated population, advancing digital infrastructure, a sizable domestic market, and greater access to financial capital. Indicators from the OECD and WIPO suggest that Türkiye has reached a balance of "high startup formation rate – rapidly maturing ecosystem", reflecting both robust entrepreneurial activity and improving innovation efficiency. Meanwhile, the global expansion of creative industries and the rising adoption of corporate venture capital (CVC) models further enhance Türkiye's prospects of emerging as a regional innovation hub. Within this context, Türkiye's strategic opportunity areas can be assessed across multiple dimensions, including entrepreneurial activity, human capital, digital infrastructure, financial mechanisms, and creative industries.

4.1.1. High Entrepreneurial Activity and Innovation Efficiency

According to OECD data, Türkiye's employer enterprise birth rate stands at 14% (score: 85), surpassing the OECD average (OECD, 2024). Over the same period, 53.8% of entrepreneurs reported intentions to create new employment, placing Türkiye among the top-performing OECD countries in this regard. Evidence from the Global Innovation Index data positions Türkiye 51st in innovation inputs and 28th in outputs (WIPO, 2024), highlighting a pronounced gap that exhibits the country's high

innovation efficiency relative to its available resources. The expanding network of incubators and accelerators has enabled startups to innovate and advance their solutions more effectively.

4.1.2. Human Capital

The OECD's Talent Element indicator assigns Türkiye a score of 14.8, while the Global Innovation Index (GII) 2024 data report a higher education enrollment rate of 111%, ranking 17th globally (OECD, 2024; WIPO, 2024). These figures highlight Türkiye's advantage of possessing a young, educated, and digitally literate population. Notably, STEM graduates from universities represent a significant potential driver of future entrepreneurship and innovation.

4.1.3. Development of Digital and Physical Infrastructure

According to OECD, Türkiye's Infrastructure Element score increased to 25.2, reflecting steady growth between 2016 and 2023 (OECD, 2024). GII 2024 data further highlight Türkiye's ranking: 52nd in overall infrastructure, 35th in e-government participation, and 36th in ICT access (WIPO, 2024). This progress establishes a strong foundation for the digital economy and AI-based startups, enabling scalable, data-driven innovation.

4.1.4. Large Domestic Market and Financial Accessibility

With a GDP (PPP) of \$3.6 trillion, Türkiye offers a substantial regional market that can support entrepreneurship. OECD data indicate that early-stage VC investments are increasing (38.5 per 100 firms), while GII ranks Türkiye 47th in the market sophistication category (OECD, 2024; WIPO, 2024). Although the country's capital base is still maturing, the scalability of the domestic market remains a major opportunity for entrepreneurs.

4.1.5. Global Growth Potential in Creative Industries

According to GII 2024, Türkiye ranks 41st in creative outputs, performing particularly well in mobile app development (28th) and online creative service exports (20th) (WIPO, 2024). This trend aligns with the OECD's Intermediate Services indicators, which show consistent growth from 2016 to 2023 across areas such as coaching, incubation services, and technical employment. Consequently, Türkiye holds the potential to become a regional hub in sectors such as AI, gaming, SaaS, design, and digital media (OECD, 2024).

4.1.6. Expansion of Financial Mechanisms

According to Startups.watch (2024), Türkiye hosts 525 active venture capital investment funds (GSYF). Since 2024, the increasing prevalence of corporate venture capital (CVC) models has served as a bridge between public funds and private capital,

while traditional VC firms continue to play a major role in the market. For instance, Revo Capital completed its first close at \$86 million in 2025, targeting a total fund size of \$100 million, which is expected to generate a multiplier effect of \$3.2 billion. Notably, 92% of this capital originated from foreign investors (Webrazzi, 2025).

4.2. Challenges

Despite its high potential, Türkiye's AI startup ecosystem faces a series of structural, institutional, and talent-based challenges. Data from the OECD and WIPO indicate that while Türkiye holds a strong position in terms of entrepreneurial dynamism and innovation efficiency, this momentum is not sufficiently supported by the country's institutional infrastructure, R&D capacity, and mechanisms for knowledge commercialization.

Disparities in educational quality, talent migration, and limited university-industry collaboration reduce the overall impact of human capital within the ecosystem. Moreover, low female entrepreneurship rates, regional concentration of innovation activities, and underdeveloped exit mechanisms limit Türkiye's ability to transform its entrepreneurial activity into a sustainable growth model.

The following section analyzes the key challenges confronting Türkiye's AI ecosystem across six dimensions - institutional, financial, and socio-economic - providing a comprehensive assessment of the systemic barriers that constrain its full potential.

4.2.1. Institutional Structure and Governance Issues

According to the OECD report, Türkiye's Institutions Element score remains relatively low at 3.0. Key indicators, including the rule of law (47/100) and control of corruption (21/100), continue to constrain investor confidence (OECD, 2024). Similarly, the GII 2024 data rank Türkiye 97th in ease of doing business, identifying gaps in institutional reform and regulatory instability as crucial weaknesses of the ecosystem (WIPO, 2024).

4.2.2. Insufficient R&D and Knowledge Production

The OECD's Knowledge Element score for Türkiye stands at 21.7, with a patent rate of only 0.8 per million people and R&D expenditure equivalent to 1.4% of GDP (OECD, 2024). The GII data confirm this picture, placing Türkiye 44th in knowledge and technology outputs (WIPO, 2024). The evidence indicates that academic knowledge production has not yet been effectively commercialized, and technology transfer mechanisms remain underdeveloped.

4.2.3. Educational Outcomes and Brain Drain

Türkiye's Talent Element score is 14.8, while its average PISA score stands at 461.9 (OECD, 2024), reflecting gaps in educational quality and skills alignment that constrain the growth of the entrepreneurial ecosystem. Data from TÜİK (2024) show

that the brain drain rate among higher education graduates reached 6.7% in information and communication technologies and 2.7% in natural sciences, mathematics, and statistics. These figures underscore the challenge of maintaining a sustainable domestic talent base for AI companies.

4.2.4. Limited University–Industry Collaboration

OECD data show that Türkiye’s university–industry collaboration score is 3.6/7, while the GII ranks the country 53rd in business sophistication (OECD, 2024; WIPO, 2024). The TÜBİTAK 2024 Activity Report indicates that the number of funded universities–industry R&D and innovation projects fell short of its target (TÜBİTAK, 2024), suggesting that a shared R&D culture has not yet fully matured within the ecosystem.

4.2.5. Gender Gaps and Regional Concentration

According to Startups.watch (2025), 24% of newly founded startups in Türkiye included at least one female founder in the first nine months of 2025. However, OECD data reveal that female entrepreneurship and management rates remain significantly lower than those of men (OECD, 2024). Türkiye’s geographic startup density score (63.4) also indicates a high concentration of entrepreneurial activity in Istanbul and a few metropolitan centers (Startup Blink, 2024).

While this concentration highlights the weakness of regional innovation ecosystems, it also demonstrates Istanbul’s magnetic pull as an emerging hub. For example, Slush, the renowned Finnish startup event, held one of its global editions in Istanbul in 2025 (Istanbul Slush’D, 2025), and the global accelerator Techstars launched its Istanbul chapter with an official announcement on October 31, 2025 (Techstars, 2025).

4.2.6. Underdeveloped Exit Mechanisms

Türkiye currently hosts six technology-based unicorns valued at over \$1 billion—Peak Games, Getir, Dream Games, Trendyol, Hepsiburada, and Insider (Ministry of Industry and Technology, 2025). Despite their success, secondary markets and exit mechanisms necessary for post-growth scaling remain underdeveloped, limiting liquidity and long-term investor engagement.

Türkiye’s AI startup ecosystem demonstrates significant potential, supported by strong human capital and institutional accelerator models that facilitate early-stage innovation and internationalization. Yet, persistent challenges span scaling, capital depth, knowledge commercialization, and inclusivity.

On the opportunity side, Türkiye benefits from high entrepreneurial activity, a STEM-oriented talent pool, rapidly advancing digital infrastructure, and a sizable domestic market, collectively positioning it to become a regional AI hub. The expansion of financial mechanisms, particularly through public funds and CVC models, has begun to deepen the country’s capital base.

Conversely, weaknesses in institutional governance, low rates of R&D commercialization, talent migration, and limited university–industry collaboration continue to restrict ecosystem maturity. Structural barriers to inclusivity, including low female entrepreneurship and the concentration of startups in Istanbul, further compounds these challenges. Additionally, the underdeveloped exit mechanisms remain among the most critical barriers to sustainable capital circulation and long-term ecosystem resilience.

Overall, Türkiye’s AI ecosystem exhibits strong foundational potential but faces structural constraints that must be addressed to achieve scalable maturity.

Conclusion

In recent years, Türkiye’s AI startup ecosystem has undergone a remarkable transformation, both qualitatively and quantitatively. Data from the OECD and WIPO highlight the country’s strong entrepreneurial energy, a young and digitally skilled population, and significant regional innovation potential. However, structural constraints in capital depth, R&D commercialization, and institutional governance have so far prevented the ecosystem from fully achieving global-scale maturity.

Institutional venture platforms such as YZF now play a pivotal role in bridging these gaps, facilitating the commercialization and internationalization of early-stage innovations. YZF’s investment model represents a new private-sector-driven innovation paradigm that complements Türkiye’s traditionally publicly supported ecosystem. Notable success stories, such as Vispera, Novus, and Text2Test, demonstrate Türkiye’s evolution from a local technology producer into an innovation exporter, delivering AI-driven solutions to global markets.

Looking forward, Türkiye’s AI startup ecosystem stands at the threshold of transitioning from “high potential – limited maturity” to scalable, globally competitive maturity. Beyond 2026, coordinated public strategies, private capital investments, and international network linkages could position Türkiye as a regional hub for AI and deep-tech innovation. The long-term sustainability of this transformation will depend on consolidating collaborations around data, capital, and talent across all key stakeholders.

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