



# Central Europe National Innovation Systems Assessment

COUNTRY REPORT

# BULGARIA





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# Abbreviations

AI	Artificial intelligence
GDP	Gross domestic product
ICT	Information and communications technology
INSAIT	Institute for Computer Science, Artificial Intelligence and Technology
IP	Intellectual property
JEREMIE	Joint European Resources for Micro to Medium Enterprises
M&E	Monitoring and evaluation
MIG	Ministry of Innovation and Growth
MoES	Ministry of Education and Science
MPI	Management Practices Index
MSMEs	Micro, small, and medium-sized enterprises
RIS3	Innovation Strategy for Smart Specialization
SME	Small and medium-sized enterprise
STEM	Science, technology, engineering, and mathematics
STI	Science, technology, and innovation
TFP	Total factor productivity
TTO	Technology Transfer Office
VC	Venture capital
VET	Vocational education and training

1.

# Key messages<sup>1</sup>

## MAIN FINDINGS

**Bulgaria's innovation system is vibrant in select niches, but faces ongoing systemic challenges, fragmented governance, and a gap between successful tech hubs and wider economic impact.** Sofia is Bulgaria's—and one of Southeastern Europe's—primary information and communication technology (ICT) hubs with high startup rates and strong firms, yet overall innovation in Bulgaria lags behind the European Union (EU), due to low R&D spending (around 0.8% of GDP, versus an EU average of 2.2%), limited patent activity, and slow diffusion of advanced technology among small and medium-sized enterprises (SMEs), with only 5.4% introducing new or improved products. . The country's main challenges lie in not only creating new technologies, but also in adapting and disseminating proven technologies, managerial practices, and digital tools throughout the enterprise sector. Businesses fund most of Bulgaria's R&D—at 70% one of the highest shares in the EU—but total investment remains low, constraining productivity gains. This is compounded by shortages of skilled talent, weak commercialization channels, scarce growth-stage finance, and poor alignment between education and labor market needs. Financial markets remain shallow: venture capital investment stands close to 0.05% of GDP—well below the EU average —while banks primarily channel funds into household loans and government securities, avoiding high-risk, intangible R&D investments. EU-backed seed capital is relatively abundant, but growth-stage finance is scarce, leaving firms that seek to scale either underfunded or reliant on foreign investors, which reduces domestic value capture. In human capital and research, Bulgaria faces demographic decline, persistent skills mismatches and although net migration has turned positive in recent years, suggesting early signs of stabilization it remains insufficient to offset population aging and labor shortages. Tertiary attainment has risen to 41% but quality remains below EU benchmarks; the science, technology, engineering, and mathematics (STEM) supply is weak (close to 19% of total graduates); and vocational education and training (VET) is poorly aligned with labor market needs. Public research suffers from underfunding and lack of integration with industry, and science, technology and innovation (STI) policy is fragmented and focused more on infrastructure than capabilities. Innovation is concentrated in Sofia, with regional disparities and limited absorptive capacity elsewhere. Addressing these challenges will require deeper reforms in finance, skills, collaboration, and governance to enable more broad-based, innovation-led growth.

1 This report was prepared by Mariya Maerkova as a country summary for the EU Regular Economic Report 11.

## MAIN RECOMMENDATIONS

**The recommendations in this country profile seek to enhance the effectiveness of public spending on STI, overcome systemic challenges and advance Bulgaria toward a more robust, knowledge-based and innovation-driven economy.** These suggestions aim to address the market and system failures identified through an analysis of the national innovation system framework (see Box 2.1), which assesses innovation demand and supply, as well as factors that determine the accumulation of capital, knowledge and technology. The recommendations are designed to enhance research and firm capabilities, foster academia-business collaboration, and improve innovation policy governance. A key emphasis is placed on promoting coherence and complementarity among various policy instruments and fostering consistency and predictability in funding and policy frameworks, which is crucial for stimulating long-term STI investments.

- **MODERNIZE AND STREAMLINE GOVERNANCE:** Ensure effective implementation of the Law on Research and Innovation Promotion with clear institutional mandates, coordination mechanisms, and financial responsibilities and establish a National Coordination Council for Research and Innovation with formal mandate-setting under the Council of Ministers or a Deputy Prime Minister to align policies across ministries and managing authorities, reduce overlap, and strengthen accountability and performance monitoring.
- **EXPAND THE FINANCING LADDER:** Address the growth-stage (Series B+) financing gap by creating a National Growth Fund, capitalized with public resources but professionally managed, and by enabling institutional investors to participate in venture and growth equity markets. Modernize collateral frameworks to recognize intangible assets such as intellectual property, software, and data as eligible for credit guarantees.
- **STRENGTHEN HUMAN CAPITAL ALIGNMENT:** Modernize STEM and digital education, scale up dual-VET pathways, and expand lifelong learning and SME reskilling programs in digital, managerial, and green skills.
- **IMPROVE SCIENCE-INDUSTRY COLLABORATION:** Introduce performance-based funding for universities and public research organizations, professionalize Technology Transfer Offices (TTOs) with stable financing and IP expertise, and expand proof-of-concept schemes to de-risk early commercialization.
- **ENHANCE REGIONAL INNOVATION CAPACITY:** Strengthen regional implementation of Research and Innovation Strategies for Smart Specialisation (RIS3) by empowering Regional Partnership Networks with decision-making authority within defined mandates and operational budgets, supporting cluster-upgrading and supplier-development programs, and funding collaborative SME-university projects that connect regional ecosystems to national assets such as Sofia Tech Park and INSAIT.
- **FOSTER AN ENTREPRENEURIAL AND REINVESTMENT CULTURE:** Encourage serial entrepreneurship, mentorship, and reinvestment through targeted, state-aid compliant tax incentives and co-financed mentorship programs. Establish structured diaspora investment platforms, modernize insolvency and second-chance frameworks, and require publicly funded accelerators to integrate mentoring and corporate partnerships to spread know-how.

2.

# Introduction to the Bulgarian innovation system: Analysis and context

## ANALYTICAL FRAMEWORK

**This note assesses Bulgaria's innovation ecosystems based on a version of the national innovation systems framework developed by the World Bank (Box 2.1).** This framework broadens the definition of innovation policy from a narrow focus on R&D and invention to encompass the full spectrum of firm-level capabilities—including quality upgrading, organizational change, and the capacity to absorb external technologies—as well as the governance and policy context in which innovation occurs. The note evaluates Bulgaria's systemic dimensions using the framework shown in Figure B2.1.1 in Box 2.1 as a guide:

- Section 3 explores the elements behind the demand for innovation (right-hand column in Figure B2.1.1), including the current state of firm capabilities, and the incentives and dynamics that affect entrepreneurship efforts.
- Section 4 evaluates innovation supply—essentially the education and training system and collaboration between academia/R&D and industry (left-hand column in Figure B2.1.1).
- Section 5 studies the factors that enable the allocation and accumulation of capital, knowledge and technology (middle column in Figure B2.1.1). These include finance (both risk capital and banking), the regulatory and cultural environment, and the public policy mix in support of innovation.
- Section 6 assesses the governance setup for overseeing the innovation system.
- Section 7 concludes with detailed policy recommendations.

While we are assessing individual dimensions, overall performance depends on their interaction. Weaknesses or misalignments in any dimension can limit returns to other investments.

**BOX 2.1 An extended national innovation systems framework**

Following Maloney and Cusolito (2018), the national productivity system framework extends the traditional national innovation system framework by integrating the accumulation and interaction of physical, human, and knowledge capital as drivers of productivity growth. Based on this framework, we have assessed the innovation system against the broader concept in which outcomes depend on how effectively the different dimensions, including multiple actors, interact.

At the center are *firms* which adopt, adapt, and create technologies. Their incentives and capabilities ultimately shape whether knowledge translates into productivity gains. Supporting them are *public research organizations and universities*, which generate basic research, train human capital, and provide spillovers to the private sector. *Government and policy institutions* also play a crucial role by setting regulations, incentives, and governance structures that can either foster or constrain innovation. A range of *intermediaries*—including technology transfer offices, venture capital providers, incubators, and business associations—reduce information frictions and help connect firms with sources of knowledge and finance. *Consumers*, in turn, influence firm behavior through their demand for higher quality, greener, or more advanced products.

The framework identifies several essential functions that an effective innovation system must perform (Figure B2.1.1). On the supply side, *knowledge creation and research* take place in universities, laboratories, and firms engaged in new technology development. Equally important is the *diffusion and absorption of global frontier technologies into local firms*, which often accounts for the bulk of

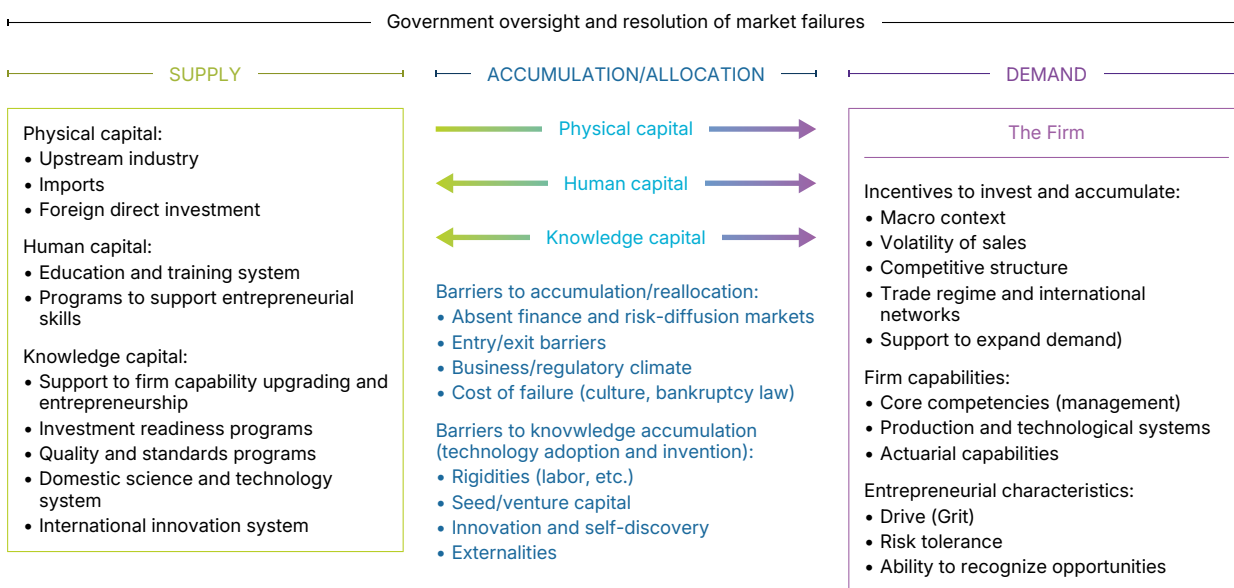
productivity growth in developing and middle-income economies. This depends on enabling factors. *Financing mechanisms*—including venture capital, bank credit, public grants, and procurement—provide the resources needed to sustain innovation. *Skills formation*, through education, training, and managerial development, ensures that firms are able to absorb and apply new knowledge. *Collaboration and networks* link firms to each other, to research institutions, and to global value chains, enhancing learning and technology transfer. Finally, *entrepreneurship* drives entry, experimentation, and the scaling up of innovative firms.

Underlying this framework is the idea that productivity and innovation do not result simply from increasing research and development spending, but from the effective functioning of a whole system of interactions. Bottlenecks can emerge in any part of the system: from weak managerial skills and poor financing channels to rigid labor markets or insufficient mechanisms for technology diffusion (see the middle column in Figure B2.1.1). Overcoming them requires policies that are diagnostic and systemic, tailored to identify which elements of the innovation system are binding in a given context, rather than assuming a one-size-fits-all approach.

The policy implications are clear. Countries must move away from linear “science-push” strategies that focus narrowly on subsidizing R&D, and instead recognize the complementarities across the system, such as the interaction between finance, skills, and networks. Effective reform requires targeting systemic bottlenecks with coordinated interventions, as well as considering sequencing, since in catching-up economies, technology diffusion and adoption are often more urgent priorities than frontier invention.

Source: Cusolito and Maloney (2018), *Productivity Revisited: Shifting Paradigms in Analysis and Policy*. Washington, DC: World Bank.

**FIGURE B2.1.1 A national innovation system framework contains many elements**



Source: Cusolito and Maloney (2018).

## INNOVATION CONTEXT

**Bulgaria has made steady progress in bringing income levels closer to the EU average since joining the EU in 2007, but further gains now hinge on a shift from factor accumulation to productivity-led growth.** In the decade before the pandemic, GDP expanded by more than 3% annually, supported by rising employment, EU integration, and strong inflows of capital and remittances. These drivers are now largely exhausted. Since 2019, successive shocks—including the COVID-19 crisis, supply chain disruptions, energy price spikes, and inflationary pressures following Russia’s invasion of Ukraine—have slowed growth and eroded competitiveness. Total factor productivity (TFP) growth has been low since 2009 (Figure 2.1), while demographic decline and outward migration have constrained labor supply, and rising real wages have narrowed cost advantages. In addition, Bulgaria’s export structure exhibits moderate economic complexity, with an Economic Complexity Index (ECI) score of around 0.6 and a global ranking at 41<sup>st</sup>, placing it below the EU average and regional peers. With GDP per capita in PPP terms at about 66% of the EU average in 2024—the lowest of all EU Member States—Bulgaria’s convergence prospects will depend on accelerating efficiency gains at the firm level through stronger innovation, technology diffusion, and investment in skills and other intangible assets (World Bank, 2023b).

**FIGURE 2.1** Total factor productivity has stagnated

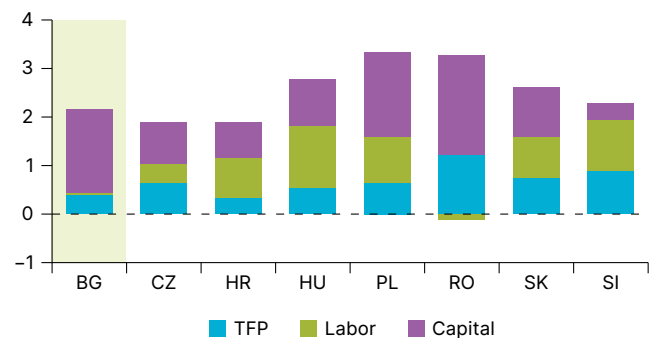
a. Total factor productivity trends, 1995–2025

2001 = 1



b. Decomposition of GDP growth, 2010–2023

Percentage points



Source: Penn World Table (2025)

Note: TFP is measured relative to each country’s TFP in 2021 (value is 1 in 2021). Descriptive decomposition of GDP growth based on average annual log growth rates of total factor productivity (ctfp), employment (emp), and the capital stock (ck) from Penn World Table 11.0.

**Bulgaria’s growth model has relied on low value-added, labor-intensive activities, with limited innovation and technological upgrading, which has constrained productivity gains and hindered economic diversification.** While industrial manufacturing and ICT exports have expanded in recent years, much of the economy remains anchored in low-technology services, construction, and traditional industries with limited innovation intensity (European Commission, 2025; OECD, 2023). Consistent with this structure, recent productivity trends show a divergence between rising TFP, and stagnating gross value added per person employed, indicating that efficiency gains within firms have not translated into higher average labor productivity. This reflects weak reallocation toward more productive firms and sectors, with employment growth concentrated in lower-productivity activities. As a result, aggregate productivity growth remains modest, and Bulgaria continues to lag behind EU peers in efficiency, technological upgrading, and diffusion of advanced practices.

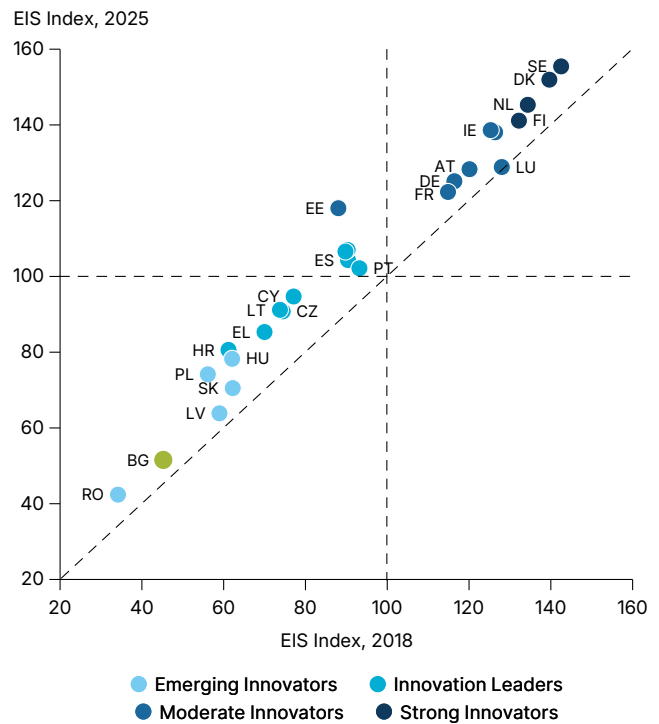
**Bulgaria ranks among the weakest performers in the 2025 European Innovation Scoreboard (EIS), with persistent gaps across nearly all dimensions of innovation capacity.** In the 2025 EIS, Bulgaria is classified as an “Emerging Innovator”, with an Innovation Index equal to 45.8% of the EU average—slightly below its 2024 score (European Commission, 2025). This places Bulgaria well behind regional peers such as Croatia, which have advanced to higher innovation performance groups (Figure 2.2). The underlying indicators reveal chronic weaknesses in government support for R&D, firm-level innovation activity, intellectual property generation, and employment outcomes from innovation. Bulgaria remains near the bottom of the EU for patent applications, collaborative R&D, and innovation uptake. The country’s

innovation potential—driven by a small number of dynamic firms in ICT and outsourcing—remains underutilized, not helped by weak spillover effects across the wider economy. Low levels of R&D investment, fragmented support institutions, and insufficient links between research and business have hindered the translation of knowledge into productivity growth (Cirera and Maloney, 2017; European Commission, 2023).

**Most Bulgarian enterprises operate far from the technological frontier, relying on imported machinery and incremental process changes rather than on the absorption of digital, organizational, or managerial innovations.** Surveys show that only a small minority of firms employ advanced digital tools or structured management systems, while investment in intangibles—software, data, R&D, and training—remains far below EU averages (European Commission, 2024a; European Investment Bank, 2025b). These weaknesses cut across sectors and regions: productivity differentials within industries are larger than those between them, underscoring that Bulgaria’s growth challenge is primarily within-firm and capability-based.

**Bulgaria’s innovation landscape has become increasingly polarized, with frontier excellence coexisting alongside widespread slow technological adoption and weak diffusion.** A narrow group of frontier firms—mainly in Sofia and a few export-oriented clusters—operate at high productivity levels, while most enterprises in lagging regions and traditional industries remain trapped in low-technology equilibria. The ICT and pharmaceutical sectors illustrate Bulgaria’s potential to compete globally when skills, regulatory alignment, and market orientation converge (see Box 3.1 in Section 3), but these remain “islands of excellence”—internationally integrated yet weakly connected to domestic suppliers, SMEs, and universities. Leveraging Bulgaria’s extensive network of scientists, engineers, and entrepreneurs abroad could help diffuse know-how, capital, and market access from frontier sectors to lagging firms and regions.

**FIGURE 2.2** Bulgaria is near the bottom of the innovation scoreboard



Source: European Commission (2025). European Innovation Scoreboard

3.

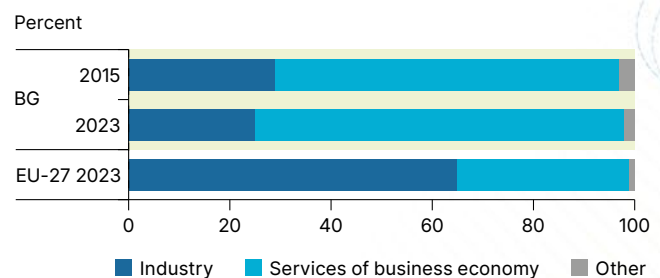
# Demand in the innovation system

## SECTORAL SPECIALIZATION

**Bulgaria's innovation system is shaped by a services-led model of technological upgrading, anchored in a rapidly expanding ICT and business services sector and supported by foreign direct investment (FDI) as the primary channel for technology transfer and capability upgrading.** While manufacturing remains an important part of the productive base—particularly in automotive components, electronics, and pharmaceuticals—innovation activity is heavily skewed toward services. By 2023, nearly three-quarters of business R&D expenditure was concentrated in services within the business economy, with industry accounting for only about one quarter, a composition that contrasts sharply with the EU27, where business R&D remains predominantly industry-based (Figure 3.1). Foreign-controlled enterprises account for roughly one quarter of value added and contribute a substantial share of business R&D expenditure, particularly in export-oriented manufacturing and ICT. Over the past decade, Bulgaria has attracted a wave of multinational R&D, engineering, and digital-service centers, leveraging its technically skilled workforce and competitive operating costs. These investments have accelerated digital upgrading and high-skilled employment but remain largely embedded in global corporate mandates, generating limited spillovers to domestic suppliers, SMEs, and startups.

**Bulgaria's innovation ecosystem has expanded primarily through selective integration into global markets, driven by foreign investment in export-oriented manufacturing and, increasingly, in ICT and business services.** Multinational firms have established engineering, digital, and shared-services operations that leverage Bulgaria's technically skilled workforce and competitive cost structure. While export sophistication has improved, Bulgaria continues to lag regional peers in the use of foreign value added and in non-cost competitiveness, limiting opportunities for technology diffusion and knowledge spillovers (International Monetary Fund, 2024). These gaps weaken startups' ability to access international markets, strategic partners, and investors. Sustaining growth in the innovation ecosystem will therefore require more than expanding scale-up finance or improving managerial

**FIGURE 3.1** Services dominate Business R&D in Bulgaria compared with the EU27



Source: Eurostat.

capabilities. It will also require stronger institutional coordination and deeper international linkages to connect Bulgaria's existing high-performing niches to the broader economy and support productivity and technological diffusion (Box 3.1).

### BOX 3.1 Innovation islands: Bulgaria's success stories in ICT and pharmaceuticals

Bulgaria's experience in information and communication technology (ICT) services and pharmaceuticals shows that the country can build globally competitive sectors when the right mix of skills, inherited capabilities, regulatory alignment, and market integration is in place. These sectors emerged through the interaction of path-dependent industrial strengths, EU convergence incentives, and sustained private investment. They demonstrate that innovation-led growth is possible within Bulgaria's economic structure—but also that the diffusion of capabilities to the wider economy remains limited.

ICT services have emerged as Bulgaria's leading growth engine, employing more than 120,000 specialists and accounting for nearly one-quarter of total service exports (WITS, 2023). This success builds on Bulgaria's strong STEM foundations, rooted in long-standing strengths in mathematics and engineering, and its early integration into global digital value chains through outsourcing and R&D partnerships. EU-supported financial instruments—such as the Joint European Resources for Micro to Medium Enterprises program (JEREMIE) and the Fund of Funds—have played a catalytic role in developing the venture ecosystem (EIB, 2024). The country has also developed a growing ecosystem of tech clusters and accelerators (especially around Sofia), and broadband

infrastructure in urban centers has improved significantly. However, growth remains concentrated in Sofia and largely confined to digital services, with limited spillovers to manufacturing and other non-ICT activities, and infrastructure and ecosystem strength remain uneven across regions and sectors.

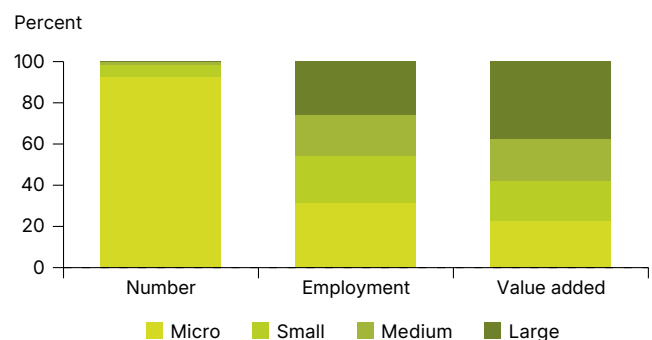
The pharmaceutical and biotechnology industries exemplify Bulgaria's strategic industrial upgrading, grounded in legacy scientific capacity and alignment with EU regulatory frameworks. Building on long-standing expertise in chemical and veterinary sciences, the sector has modernized production and quality systems to meet EU Good Manufacturing Practice (GMP) standards, enabling access to European and global markets (OECD, 2024; European Commission, 2023). Competitiveness in the sector is underpinned by sector-specific R&D investment, a highly qualified scientific workforce, and export diversification—particularly in generic medicines and animal health products, where Bulgaria holds comparative advantages (SeeNext, 2022). The industry also benefits from targeted modernization support financed through EU structural and investment funds and cooperation with research institutes (EIB, 2024). However, linkages with domestic suppliers and smaller firms remain weak, limiting knowledge diffusion and cross-sector spillovers (European Commission, 2024b).

## FIRMS' CAPABILITIES

**Innovation in Bulgaria is concentrated within a small core of large and foreign-owned firms, exposing weak diffusion mechanisms across the wider SME base.** Bulgaria's enterprise landscape is dominated by micro and small firms but driven by a narrow segment of large and foreign-owned companies that concentrate most productivity and innovation activity. Microenterprises account for over 92% of all firms yet generate only around 23% of value added and one-third of employment. In contrast, large enterprises—fewer than 0.2% of all firms—produce more than 37% of value added and employ over 25% of the workforce (Figure 3.2). Their dominance extends to technological investment: large firms conduct over half of business R&D spending and a similar share of capital formation. Foreign-controlled enterprises contribute about 24% of value added, while roughly 40% of business R&D expenditure is financed from foreign sources, highlighting Bulgaria's strong dependence on internationally-linked firms for innovation and export performance (European Commission, 2025; Eurostat, 2024; EBRD, 2025).

**Firm demographics reveal a geographically concentrated and uneven entrepreneurial landscape.** The Southwestern region, home to Sofia, hosts the largest number of enterprises (165,900, or roughly 31% of all firms), while the Northwestern region records the fewest (27,000) (NSI Bulgaria, 2023). Sofia remains Bulgaria's dominant growth pole, accounting for about 40% of national GDP, 43% of total employment, and around half of foreign direct investment inflows (Eurostat, 2025). Other dynamic centers include Plovdiv region, which contributes roughly 10% of GDP and is emerging as a leading outsourcing hub; as well as the

FIGURE 3.2 Contribution to the Bulgarian economy by firm size, 2023



Source: Eurostat.

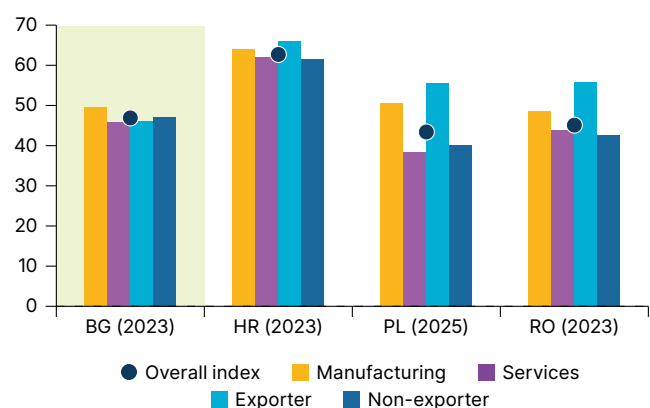
coastal cities of Varna and Burgas, which serve as regional economic engines. This concentration underscores the dual nature of Bulgaria's economy—high-productivity and innovation-intensive activity is clustered in a few urban centers, while peripheral regions, particularly in the Northwest, struggle with aging populations, low business creation, and structural economic stagnation.

**Despite growing digital infrastructure, firms in Bulgaria face significant capability constraints arising from low digital skills levels and limited adoption of advanced technologies.** According to the Digital Economy and Society Index (DESI) and the EU's *State of the Digital Decade*, only 35.5% of Bulgarians aged 16–74 have at least basic digital skills, well below the EU average of 55.6% (European Commission, 2024a & b). At the firm level, only around 14.2% of Bulgarian enterprises have adopted cloud technologies (versus an EU average of 38.9%), about 3.6% have adopted artificial intelligence (versus an 8% EU average), and approximately 21.9% are using data-analytics tools (versus a 33.2% EU average). These figures reflect structural misalignment: many businesses remain rooted in traditional sectors and lack capability or intensity in digitalization. While the Bulgarian government has launched several initiatives—including the Digital Bulgaria 2025 Programme and advisory measures for SMEs supported by the Recovery and Resilience Facility (RRF)—progress towards convergence with the EU Digital Decade targets<sup>2</sup> has remained gradual, and performance continues to lag the EU average.

**Most firms remain distant from the technological frontier, with limited diffusion of innovation in all but a narrow group of high-performing exporters and ICT firms.** According to the World Bank Enterprise Survey (World Bank, 2023a), only 5.4% of SMEs had introduced a new or significantly improved product or service over the previous three years. Fewer than one in ten use technology licensed from abroad, and only 20% hold an international quality certification—less than half the regional average for Europe and Central Asia. However, recent survey evidence shows an uptick in Bulgarian firms investing in the development or introduction of new products. Yet they remain behind the EU average for using multiple advanced digital technologies (35% vs 51%) (European Investment Bank, 2025b).

**Weak managerial and organizational practices are a key contributing factor behind this under-adoption.** Evidence from the World Bank Bulgaria Enterprise Survey 2023 shows that firms perform below regional and global benchmarks for structured management systems. Bulgaria's average Management Practices Index (MPI) stands at 46.9 (Figure 3.3), compared with 62.7 in Croatia and 61.5 in the United States (Grover et al., 2019; World Bank, 2023a). While some large and export-oriented enterprises apply systematic performance monitoring and data-driven decision making, most small and medium-sized firms lack formal target setting, feedback mechanisms, and incentive systems to promote continuous improvement. Firm-level survey evidence confirms strong heterogeneity across size and sector, with manufacturing firms tending to apply more structured management systems than those in non-knowledge-intensive services. Unlike in other countries, Bulgarian exporters do not consistently outperform non-exporters on management systems, indicating that international exposure has not yet translated into stronger managerial capabilities (World Bank, 2023a).

**FIGURE 3.3** Bulgaria's managerial performance could be stronger in all sectors



Source: World Bank Enterprise Survey.

Note: Years in parentheses indicate latest survey wave for that country.

<sup>2</sup> Under the EU's Digital Decade Policy Programme 2030, the European Union has set a target that at least 80 percent of people aged 16–74 should have at least basic digital skills by 2030, alongside targets for the uptake of advanced digital technologies by enterprises, including cloud computing, artificial intelligence, and data analytics.

## STARTUPS AND ENTREPRENEURIAL SUPPORT

**Bulgaria's startup ecosystem is dynamic yet highly concentrated, driven primarily by the ICT and digital services sector.** Bulgaria ranks 39<sup>th</sup> globally and 6<sup>th</sup> in Central and Eastern Europe (CEE) on the Global Startup Ecosystem Index 2024, reflecting a vibrant but highly concentrated base of digital and service-oriented startups (StartupBlink, 2024). Sofia hosts roughly 348 active startups—about 87% of the national total—giving Bulgaria one of the highest startup densities per capita in the CEE region and comparable to Warsaw. This concentration is fueled by a deep ICT talent pool, improving broadband infrastructure, and access to EU-backed seed capital and early-stage financing (see Box 3.1 for more details). ICT service exports reached US\$4.4 billion in 2023, accounting for roughly one-quarter of total service exports (BNB, 2024), demonstrating the strength of this digital cluster.

**The country has reached important milestones with the emergence of a unicorn and a listed technology champion.** Payhawk's rapid scaling in fintech—achieving unicorn status in 2022—and Shelly Group's success in smart-home and Internet of Things (IoT) technologies crossing the US\$1 billion market valuation mark in 2025—have drawn international investor attention and signaled that Bulgarian firms can compete at the technological frontier.

**Investment momentum in Bulgaria's startup ecosystem is growing, but financing remains uneven and vulnerable to market volatility.** Seed and early-stage funding have expanded in recent years, supported by the Fund of Funds (FoF) and EU-backed instruments. By late 2024, local venture capital funds managed about €500 million in assets, complemented by the launch of a new €60 million Entrepreneurship Early-Stage Fund under the InvestEU program (EIB, 2024; Fund of Funds, 2024). Yet access to mid- and growth-stage finance remains limited. Total venture investment fell to around €50–55 million in 2024—down sharply from €100 million in 2023—with nearly two-thirds directed to early-stage projects, underscoring the scarcity of scale-up capital. Few domestic investors provide Series B or later-stage funding, and commercial banks remain reluctant to finance intangible assets, forcing promising startups to slow expansion or relocate abroad (World Bank, 2020a; The Recursive, 2024). Across Central and Eastern Europe, roughly 25–35% of venture capital is deployed in Series B and later rounds, supported by larger domestic funds and established co-investment pipelines. In Bulgaria, by contrast, less than 10% of venture investment is estimated to reach Series B or beyond, leaving scale-ups without viable domestic financing options once early-stage support is exhausted (EIB, 2025a).

4.

# Supply in the innovation system

## HUMAN CAPITAL AND UNIVERSITIES

**Bulgaria's transition toward an innovation-driven growth model is increasingly constrained by weaknesses in its human capital base.** Persistent demographic decline, outward migration of skilled workers, and stark regional disparities have significantly reduced the available talent pool. Although Bulgaria's Innovation Strategy for Smart Specialization (RIS3) (FoF, 2024) identifies priority sectors such as ICT, mechatronics, and clean energy, the education and training system has struggled to adapt to the growing demand for advanced digital and technical skills. Firms consistently report shortages of highly qualified professionals—particularly in engineering, applied sciences, and information technology—while a significant share of tertiary graduates, especially in ICT-related fields, continue to seek employment abroad (European Commission, 2024b). These combined pressures have created a tightening skills bottleneck that undermines firms' ability to adopt new technologies, scale innovation, and move up global value chains, limiting Bulgaria's potential to transition toward an innovation-driven growth model.

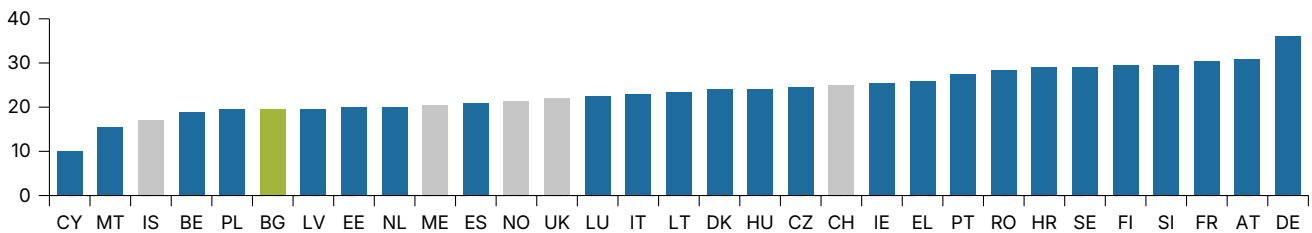
**Improvements in educational attainment have strengthened Bulgaria's skills base, but persistent gaps in quality and labor market relevance continue to limit the supply of skills needed for innovation-intensive growth.** Educational attainment in Bulgaria has improved in recent years yet concerns around the quality and labor market relevance of learning outcomes persist. International assessments show Bulgarian students performing below EU averages in mathematics, science, and reading (OECD, 2023). Although participation in tertiary education has grown, only close to 41% of young adults (aged 25–34) hold a higher-education degree, compared to 44.1% in the EU27 (Eurostat, 2024). The expansion of higher education has not been matched by improvements in labor market alignment, with employers pointing to gaps in digital competences, problem solving, and foreign language proficiency (World Bank, 2023a).

**The vocational education and training (VET) system remains a vital yet underperforming pathway for developing technical and STEM-oriented skills.** In Bulgaria, more than half of upper secondary students (about 52%) are enrolled in vocational tracks, yet employer surveys consistently express concerns about the readiness of VET graduates for innovation-driven tasks. Curricula are often outdated, instructional materials inadequate, and opportunities for effective work-based learning limited. Dual-VET pilots exist but remain too small to shift systemwide practices. Critically, the supply of STEM professionals is weak (Figure 4.1):

in 2022, only 19.3% of tertiary graduates in Bulgaria were in STEM fields (compared with an EU average of 26.6%), and just 36.1% of those STEM graduates were women—a gender gap that highlights the underutilization of talent (Figure 4.1). While overall tertiary attainment has improved, labor market relevance of VET credentials remains limited, especially in technical and digital domains (European Commission, 2024b). Evidence also suggests that VET graduates face higher risks of unemployment or inactivity than those in better-aligned peer countries, reducing the system’s effectiveness as a bridge to innovation-oriented careers.

**FIGURE 4.1** Bulgaria’s skills pipeline and STEM workforce are weak

Share of graduates in STEM programs  
Percent



Source: UNESCO Institute for Statistics. (2024). Tertiary graduates by field of study (%), ISCED-F 2013 fields 05–08 (STEM)

**These weaknesses in skills formation are compounded by fragmented research and higher-education system with limited integration into global knowledge networks, constraining innovation and technology diffusion.** The country has around 17,000 full-time equivalent researchers, and although research capacity has increased gradually in recent years, research density is one of the lowest densities in the EU, at 0.6% of total employment, compared to the EU average of 1.1% (Eurostat, 2024). Much of this capacity is concentrated in small, specialized institutes under the Bulgarian Academy of Sciences and dispersed regional universities, many of which lack the critical mass, infrastructure, and performance incentives required for globally competitive research. Collaboration between public research organizations (PROs), universities, and industry remains sporadic, limiting knowledge transfer, technology commercialization, and the creation of spin-offs (OECD, 2024).

**Bulgaria’s international research participation also lags behind EU peers.** The country ranks among the lowest in the EU for participation in Horizon 2020 and Horizon Europe on a per capita basis, reflecting limited international partnerships, insufficient project management capacity, and weak institutional support for competitive research applications.<sup>3</sup> A promising exception is the Institute for Computer Science, Artificial Intelligence and Technology (INSAIT), established in 2022 in partnership with leading global universities. INSAIT has begun positioning Bulgaria to emerge as a regional hub for deep-tech research, demonstrating how targeted excellence initiatives can enhance international visibility. However, such success remains isolated. Without systemic reforms to research governance, performance-based funding, and collaboration frameworks, Bulgaria’s science base will continue to operate below its potential, with limited capacity to diffuse innovation across the wider economy.

## R&D AND INDUSTRY COLLABORATION

**Though businesses finance around 70% of national R&D expenditure—well above Croatia and Romania and comparable to Poland—the absolute level of R&D spending is among the lowest in the EU.** In 2023 it was only 0.8% of GDP, while the EU average was 2.2%. This means that, despite the high private-sector share, business-funded R&D in Bulgaria is equivalent to roughly 0.55% of GDP, well below the level reached in many EU countries where firms may account for a smaller share of total R&D but invest substantially more in ab-

<sup>3</sup> See the European Commission’s Horizon Europe’s country profiles at [https://research-and-innovation.ec.europa.eu/statistics/framework-programme-facts-and-figures/horizon-europe-country-profiles\\_en](https://research-and-innovation.ec.europa.eu/statistics/framework-programme-facts-and-figures/horizon-europe-country-profiles_en)

solute terms. This pattern illustrates Bulgaria's "innovation paradox": despite private-sector engagement, total investment and innovation outputs remain weak because complementary inputs—skilled talent, managerial capabilities, access to finance for intangibles, and institutional support for commercialization—are insufficient (Cirera and Maloney, 2017). In practice, this means that firms invest modestly in R&D yet struggle to turn it into productivity growth. Moreover, limited diffusion of foreign technologies and slow adoption of advanced production and digital tools further constrain returns on private innovation. The result is an innovation system that is active at the frontier in a few ICT niches, but shallow in technology absorption and firm-level upgrading across the wider economy.

**Bulgaria's research system provides a weak foundation for collaboration with industry and the commercialization of knowledge.** Public research remains under-funded: in 2023, Bulgaria spent only €38.3 per inhabitant on R&D compared with an EU average of €284.7. This persistent underinvestment constrains the ability of universities and research institutes to maintain modern infrastructure, attract talent, or engage in large-scale applied projects. Research outputs remain weak: Bulgarian publications record low citation impact, limited international co-authorship, and minimal patenting activity, ranking among the lowest performers in the EU (OECD, 2024). Universities and PROs rarely engage in licensing, contract research, or spin-off creation, leaving the scientific base with little direct contribution to enterprise innovation.

**Institutional incentives and governance arrangements offer few mechanisms to strengthen R&D–industry linkages.** The research landscape is highly fragmented, dominated by small institutes under the Bulgarian Academy of Sciences and dispersed regional universities that often lack the scale, infrastructure, and management capacity to compete internationally. Research quality assurance mechanisms remain weak, with limited use of rigorous peer review, uneven evaluation standards across institutions, and low selectivity in some domestic scientific outlets, which undermines research credibility and external demand for collaboration. While most universities formally operate technology transfer offices (TTOs), these units remain underfunded, understaffed, and largely inactive. Few institutions have formal intellectual-property and revenue-sharing policies, and academic promotion still depends almost entirely on publications rather than engagement or commercialization outcomes. As a result, industry partnerships remain limited, applied research sporadic, and technology transfer largely project-dependent, sustained mainly through short-term EU-funded initiatives rather than institutionalized practice (World Bank, 2020a). Even where firm demand for collaboration exists, universities often face constraints in responsiveness and delivery capacity.

**Recent frontier initiatives highlight Bulgaria's growing capacity for high-quality research but remain largely disconnected from the broader economy.** INSAIT has attracted internationally recognized researchers and produced early commercial results, including the LogicStar AI spin-off, which reportedly secured about €2.9 million in pre-seed funding in 2025 (INSAIT, 2025). INSAIT also recently expanded its research infrastructure with a high-performance computing cluster, while a new €90 million EU-funded AI Factory (BRAIN++) at Sofia Tech Park is set to provide Graphics Processing Unit (GPU) and AI computing services for research institutions, startups, and SMEs (Sofia Tech Park, 2024). These initiatives strengthen Bulgaria's deep-tech and AI profile and demonstrate the potential of targeted excellence programs. Integration with traditional industries and regional SMEs is weak, as most firms outside the ICT sector lack the managerial, technical, and financial capacity to absorb or apply frontier research. The continued shortage of growth-stage venture capital further limits the scaling of promising spin-offs within Bulgaria, constraining spillovers from these flagship initiatives and reinforcing the country's dual innovation structure (EIB, 2024; wiiw, 2024).

**Collaboration between science and industry in Bulgaria remains among the weakest in the EU.** The European Innovation Scoreboard (European Commission, 2025) places Bulgaria near the bottom of the EU for indicators measuring cooperation between innovative SMEs and public research organizations, as well as on public–private co-publications. On the supply side, research institutions continue to emphasize academic outputs over problem-solving partnerships. On the demand side, firms invest little in intangible assets and often lack the absorptive capacity needed to collaborate effectively. These gaps reinforce each other, resulting in limited knowledge exchange and weak incentives for engagement on both sides.

**Survey evidence indicates that weak commercialization incentives are a major constraint for both researchers and firms.** Most respondents identified insufficient financial and non-financial incentives to translate research output into market-ready products or services as a key obstacle. Researchers also cited unclear intellectual-property ownership rules, under-resourced TPOs, and weak institutional incentives for applied research. In a context where total R&D spending remains among the lowest in the EU, these institutional weaknesses severely limit the capacity of universities and public research organizations to engage in commercialization and technology diffusion. Without reforms to strengthen TPO capacity, reward commercialization, and expand co-investment mechanisms, Bulgaria risks perpetuating its “innovation paradox”—where firms finance most R&D, but universities and public research organizations contribute little to commercialization and technology diffusion. This bottleneck constrains innovation-led growth and slows convergence with the rest of the EU (World Bank, 2020a).

5.

# Innovation system enablers

## ACCESS TO FINANCE

**Bulgaria's financial system is stable and well capitalized, but it remains relatively shallow compared with more advanced peers, constraining private sector investment and innovation.** As of June 2025, banking sector assets stood at about 97 percent of GDP, indicating a system that is sizeable relative to domestic credit demand yet modest by international standards. The strong predominance of banks in financial intermediation supports financial stability but also reflects limited capital-market depth and weak risk-sharing mechanisms, which reduce the availability of diversified financing for investment and innovation. Private sector credit amounted to 47.5% of GDP in 2024, well below the EU average of about 74.6% underscoring the shallow depth of financial intermediation.<sup>4</sup> Non-bank alternative finance remains underdeveloped, limiting options for equity, long-term, and risk-bearing finance. Consistent with these structural features, private fixed capital formation remains subdued, averaging around 14% of GDP in 2024, well below levels observed in advanced EU peers and the average of the upper-middle-income economies (28% of GDP), and constraining productivity growth and firm-level scaling<sup>5</sup>.

**Despite a stable and well-capitalized banking system, Bulgaria's financial intermediation model remains poorly aligned with the needs of smaller, innovative firms.** Access to credit is generally adequate for large, established firms, but SMEs and startups face more binding financing constraints. Recent evidence indicates that only 26% of small firms and 39% of medium-sized firms have a bank loan or line of credit, compared with 47% of large firms, reflecting conservative, collateral-based lending practices—around two-thirds of loans to small firms require collateral<sup>6</sup>. Banks continue to favor established firms in low-risk sectors such as real estate and construction, energy (including renewables), transport and logistics, telecommunications, and industrial production, where tangible assets and predictable cash flows dominate. In contrast, innovative SMEs and startups remain credit constrained, as intangible assets such as software, data, or intellectual property are rarely accepted as collateral. As a result, many smaller firms rely heavily on internal funds and face difficulties

<sup>4</sup> World Bank Development Indicators Database.

<sup>5</sup> World Bank Group Scorecard Database.

<sup>6</sup> World Bank Enterprise Survey (2023).

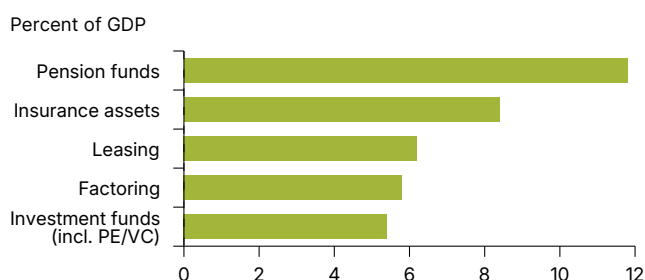
financing technological upgrading and scaling, consistent with a substantial MSME financing gap—estimated at around one-fifth of GDP<sup>7</sup>.

**The structure of non-bank financial intermediation in Bulgaria underscores the limited role of market-based finance.** Non-bank financial assets are dominated by pension funds and insurance companies, while investment funds—including private equity and venture capital—remain small, at around 5–6% of GDP. (Figure 5.1). Leasing and factoring play a more visible role, particularly for SMEs, but these instruments primarily support asset-backed financing rather than risk capital. The relatively small size of investment funds highlights the limited availability of equity and long-term risk-bearing finance, despite the growing needs of innovative and scaling firms. Overall, the composition of non-bank finance reflects a system oriented toward contractual savings and low-risk instruments, with limited capacity to support innovation-driven growth and firm-level scaling. Market-based financing options in Bulgaria remain marginal. The equity market is shallow, with stock market capitalization around 8–9% of GDP in 2024, well below EU averages of about 60% of GDP. Corporate bond markets are thin and concentrated among few issuers; outstanding non-financial corporate debt securities represent only a very small share of GDP (well under EU averages near 11%), reflecting a limited role for market-based risk finance.

**Bulgaria's venture capital ecosystem has expanded at the seed and early-stage levels but remains thin and volatile at the scale-up stage.** Following the introduction of EU-backed instruments under the JEREMIE initiative and the Fund of Funds, venture capital investment increased gradually through the late 2010s, but remained modest in macroeconomic terms (Figure 5.2). Private equity activity has also remained limited and episodic, fluctuating within a narrow range rather than exhibiting sustained growth, underscoring the absence of a stable domestic base of long-term risk capital. Despite these developments, overall venture capital and private equity investment in Bulgaria remain low relative to peers, and the financing gap becomes particularly acute at later stages of firm growth (for further details, see Section 3). Experience from small economies with less developed domestic capital markets suggests that such scale-up gaps can be addressed through well-designed public growth-capital instruments (Box 5.1). Domestic investors are largely absent from larger Series B<sup>8</sup> and subsequent rounds, forcing many high-potential firms to rely on foreign capital or relocate abroad to scale. As a result, spillovers from innovation and entrepreneurship are weakened, and domestic value capture remains limited.

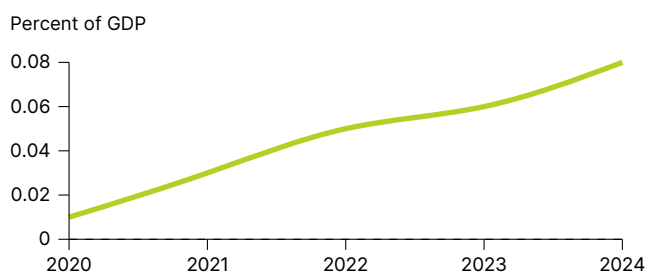
**Finally, diaspora and foreign investors play an increasingly important but double-edged role.** Bulgaria's most successful scale-ups include the unicorn Payhawk, as well as globally active listed technology companies such as Shelly Group, which recently surpassed a US\$1 billion market valuation, and frontier firms like Dronamics. In addition, several Bulgarian-founded companies that scaled abroad—such as Hyperscience—relied primarily on international or diaspora-backed capital rather than domestic funding pools (The Recursive, 2024). While this underscores Bulgaria's strong global connectivity, it also highlights persistent domestic weaknesses in institutional investment and growth-stage finance. Expanding co-investment vehicles, strengthening the participation of pension and insurance funds in venture markets, and modernizing collateral frameworks for intangible assets would be key enablers for deepening Bulgaria's innovation finance ecosystem.

**FIGURE 5.1 Non-Bank Financial Intermediation in Bulgaria Remains Limited**



Source: Bulgarian National Bank (BNB); European Central Bank (ECB); Eurostat; World Bank World Development Indicators.

**FIGURE 5.2 Venture capital and private equity investment in Bulgaria**



Source: Invest Europe.

<sup>7</sup> MSME Finance Gap database.

<sup>8</sup> Series B financing refers to growth-stage venture capital rounds, typically in the range of €10–30 million in European markets, raised by firms that have demonstrated product-market fit and are seeking to scale operations and expand internationally.

### BOX 5.1 Designing Growth-Stage Financing for Small Open Economies

In small economies with nascent domestic capital markets and thin venture ecosystems, mid- and later-stage scale-up financing gaps are widely reported. Several countries with financial depth and market size closer to Bulgaria's have addressed these constraints through publicly capitalized, professionally managed growth-equity instruments designed to crowd in private capital rather than replace it.

In the Baltic states, public fund-of-funds models have been central to ecosystem development. In Estonia, SmartCap—a state-owned investment vehicle managing public venture and growth-capital instruments—operates as a cornerstone investor in venture and growth funds, explicitly targeting scale-up financing gaps in a small, open economy. In Latvia, ALTUM—the national development finance institution—supports venture and growth equity through co-investment instruments that absorb part of the risk associated with later-stage investments, helping mobilize private capital in an otherwise thin market.

Southern Europe offers additional relevant examples. In Portugal, Banco Português de Fomento—the national promotional bank—has launched growth-capital and co-investment vehicles aimed at scaling innovative firms in an economy with limited domestic institutional investors. In Slovenia, SID Bank—the state-owned development and export bank—has played a catalytic role in venture and growth financing through publicly backed funds and guarantees, helping bridge the scale-up gap in a small financial system.

Across these cases, success depends less on public ownership per se and more on design and governance: arm's-length management, commercial investment criteria, co-investment with private funds, and a clear focus on narrowly defined market failures—typically gaps in later-stage scale-up finance (often equivalent to Series B+ in venture capital terms). This evidence suggests that, for countries with financial depth similar to Bulgaria's, a National Growth Fund can be a credible and effective instrument when structured to complement, rather than substitute for, private markets.

## REGULATORY AND LEGAL ENVIRONMENT

**Despite incremental reforms and broad alignment with EU regulatory standards, Bulgaria's regulatory and legal framework continues to impose binding constraints on innovation and firm growth, reflecting persistent gaps in implementation, predictability, and enforcement rather than deficiencies in formal rules.** Subnational B-READY in Bulgaria (2024) finds that while the regulatory framework is harmonized across cities, implementation varies substantially—especially in Dispute Resolution and Business Insolvency (World Bank, 2024). Dispute Resolution is the weakest-performing measured area (average 71.3/100), and the duration of commercial litigation differs sharply across cities, with Sofia taking more than two years from first instance through appeals in the cases measured. Business Insolvency is also characterized by slow proceedings, which can reduce investor willingness to finance high-risk firms and hinder the development of scale-up finance.

**Regulatory frictions are especially constraining for startups and scale-ups.** B-READY indicators on dispute resolution point to slow contract enforcement and limited effectiveness of judicial processes, increasing uncertainty for venture capital and private equity transactions. At the same time, under the market competition and innovation pillar, Bulgaria scores poorly on the effective enforcement of intellectual property rights. While the legal framework is broadly aligned with EU standards, implementation remains uneven, and research organizations operate under non-standardized and often unclear rules governing intellectual property ownership, revenue sharing, and spin-off formation. These weaknesses raise transaction costs, discourage industry-science collaboration, and complicate deal structuring involving university-linked technologies.

**Together, these regulatory and institutional shortcomings reinforce risk aversion among entrepreneurs, researchers, and investors, weakening Bulgaria's attractiveness for innovation-driven investment.** Strengthening regulatory certainty—particularly in insolvency resolution, contract enforcement, and IP commercialization rules—alongside accelerated administrative digitalization and structured stakeholder consultation mechanisms would materially improve the business environment for venture creation, scale-up, and technology diffusion.

## POLICY MIX

**Innovation policy support in Bulgaria remains fragmented, heavily reliant on EU structural funds, and often difficult for firms to access.** Available evidence indicates that support programs are administratively complex, with burdensome eligibility requirements, unclear guidance, and tight implementation timelines (European Commission, 2023; World Bank, 2020a). Smaller firms in particular face high transaction costs when applying for grants, frequently diverting resources from R&D or product development to administrative compliance. This complexity reduces program uptake and reinforces disparities between firms with strong management capacity and those with limited resources. While the Law on Research and Innovation Promotion<sup>9</sup> adopted in 2024 provides a formal legal framework for supporting R&D, innovation activities, and science–industry cooperation, its implementation is still at early stages, and it has not yet translated into a coherent, accessible, and well-coordinated system of support instruments.

**Public support for entrepreneurship in Bulgaria has expanded substantially over the past decade, though it remains heavily reliant on EU structural funds and tends more towards broad financing/training programs than deeper institutional capability building.** For example, despite the existence of flagship investments such as Sofia Tech Park and a network of centers of competence and excellence, survey evidence suggests that innovation efforts are still fragmented and coordination weak (OECD, 2024). The Programme for Competitiveness and Innovation in Enterprises (PCIE 2021–2027) has launched new calls under the 2021–27 cycle, including an announced BGN 127 million (around €65 million) window for enterprise innovation projects—though evaluation of the projects’ long-term impact remains pending.

**The composition and design of Bulgaria’s public support instruments reveal structural imbalances that limit long-term impact.** Large programs dominate overall funding: between 2014 and 2019, the two largest instruments accounted for 41% of total disbursements, and the top five instruments accounted for 58% (World Bank, 2021). These major programs primarily targeted SME production capacity and energy-efficiency upgrades rather than R&D commercialization, technology transfer, or scale-up support. Grants and matching-grant schemes remain the predominant form of assistance, while equity instruments, convertible loans, and performance-based financing remain marginal (World Bank, 2021; European Commission, 2023). This grant-heavy model supports administrative absorption and short-term outputs but provides weaker incentives for experimentation, private risk-taking, and investment in intangible assets—key drivers of an innovation-led economy.

**Reliance on EU funding cycles has also introduced volatility in the availability of innovation support.** Donor-driven instruments tend to operate in short, discontinuous cycles, creating “stop–start” dynamics in public funding and implementation. Periods of intense project activity are often followed by multi-year gaps with limited support—such as the delays between Operational Programme “Innovation and Competitiveness” (OPIC) and the Operational Programme “Science and Education for Smart Growth” (OP SESG) programming periods—undermining continuity and discouraging long-term investment planning by startups, universities, and research institutes (World Bank, 2021). As a result, Bulgaria’s policy mix is marked by fragmentation and short-termism rather than coordinated, sustained support for innovation-driven growth. The lack of a stable national funding framework further limits the ability of public research organizations and firms to commit to multi-year, higher-risk innovation projects (wiiw, 2024).

9 <https://dv.parliament.bg/DVWeb/showMaterialDV.jsp?idMat=214107>

## ENTREPRENEURIAL CULTURE

**Cultural and behavioral factors also shape Bulgaria's entrepreneurship trajectory.** Survey evidence shows a combination of relatively strong interest in entrepreneurship and limited ambition for business growth. According to the Global Entrepreneurship Monitor (GEM) Bulgaria report (2017–2019), early-stage entrepreneurs exhibit high participation rates but generally low expectations for firm expansion: around 70% report no intention to create jobs, while only 20% expect to create one to five jobs within five years. GEM data and the OECD's Inclusive Entrepreneurship: Country Assessment Notes—Bulgaria (2018) also show that necessity-driven entrepreneurship remains comparatively high, reflecting structural labor-market and opportunity constraints. Risk aversion is a persistent feature of Bulgaria's entrepreneurial environment. According to GEM Bulgaria (2017–19), about 21% of adults in 2017—and 31.0% in 2018—reported that fear of failure would prevent them from starting a business despite seeing good opportunities.

**A limited culture of reinvestment and mentorship also constrains the maturity of Bulgaria's startup ecosystem.** Comparative ecosystem assessments—such as Startup Heatmap Europe (2021–2023) and the European Startup Monitor (2019)—show that Bulgaria has a relatively low density of active angel investors and founder-to-founder mentorship networks, as well as weaker connections between startups and established firms compared with more advanced European hubs (Startup Heatmap Europe 2022; ESM 2019). Evidence from the GEM Bulgaria Report 2017–2019 further indicates that experienced entrepreneurs engage less frequently in mentoring and reinvestment activities than peers in more developed ecosystems. Network gaps further restrict innovation diffusion. The European Startup Monitor reports relatively weak linkages between startups, corporates, and research organizations, limiting opportunities for collaborative R&D, cluster development, and movement into higher-value segments of global value chains (ESM, 2019).

**Engagement by the Bulgarian diaspora also remains largely ad hoc, with few structured mechanisms for startup mentoring, investment, or internationalization support.** OECD ecosystem reviews highlight that diaspora entrepreneurship programs are limited in institutionalization and scale, reducing the potential for systematic knowledge transfer and global market access (OECD, 2018). As a result, diaspora engagement tends to rely on informal, project-based initiatives rather than sustained platforms capable of supporting firm scaling, access to foreign markets, or integration into global innovation networks.

6.

# Government strategic oversight

**Bulgaria's strategic framework for science, technology, and innovation (STI) has expanded considerably in recent years, but weak coordination and institutional steering continue to undermine its effectiveness.** Multiple national strategies—including the Innovation Strategy for Smart Specialisation 2021–2027 (RIS3), the National Research Strategy, and the Roadmap for Research Infrastructures—articulate broadly consistent priorities around digitalization, the green transition, and emphasize business–science cooperation and smart specialization. In practice, however, strategic responsibility is split primarily between the Ministry of Education and Science (MoES) and the Ministry of Innovation and Growth (MIG), with limited mechanisms for joint programming, budget coordination, or shared accountability. Advisory platforms such as the Council for Smart Growth and Regional Partnership Networks play a coordination role resulting in program duplication, inconsistent priority-setting, and weak accountability (World Bank, 2020a; European Commission, 2025; wiiw, 2024).

**These strategic coordination gaps are reinforced by fragmentation and limited delivery capacity at the implementation level.** Responsibility for policy design and execution is dispersed across multiple institutions—including MoES, MIG, the National Science Fund (NSF), the SME Promotion Agency (SMEPA), and several managing authorities for EU structural funds—placing pressure on already constrained administrative capacity. The World Bank's Functional and Governance Analysis (2021) finds that Bulgaria's STI instruments perform significantly below those of peers (Croatia and Poland), particularly with respect to program design (weak intervention logic, unclear objectives) and implementation (limited monitoring and evaluation, staffing constraints, and lack of continuity across funding calls). Nationally financed STI instruments are further constrained by annual and unpredictable budget allocations, while EU-funded programs remain largely compliance- and absorption-driven rather than results-oriented. WBG advisory work suggests implementation constraints in practice. In particular, evidence from Northern Bulgaria shows that firms with the greatest productivity and digitalization gaps are also the least likely to access or absorb public support, reflecting weaknesses in program design, targeting, outreach, and learning mechanisms. Together, these factors limit institutional learning, weaken accountability for outcomes, and reinforce short-termism in STI policy delivery as mentioned in Section 5. (World Bank, 2021; wiiw, 2024).

**Weak absorptive capacity within the public administration mirrors constraints in the private sector—such as limited ability to finance and scale intangible investments—creating a systemic drag on STI policy effectiveness.** The OECD's report, Strengthening the Innovative Capacity of the Public Sector of Bulgaria (2024), underscores systemic weaknesses in administrative capacity. While senior officials increasingly recognize the importance of

innovation, only a minority of civil servants report feeling sufficiently empowered to innovate in their day-to-day work, and structured mechanisms for training, funding, or scaling innovation practices are largely absent. Without institutional consolidation, professionalized program management, and predictable financing, Bulgaria's governance framework will remain underpowered to deliver on its policy ambitions.

**Recent policy developments present opportunities to strengthen coherence.** The European Commission's Enhanced Dialogue with Bulgaria—launched in June 2025 and supported by a Policy Support Facility (PSF) review process—explicitly targets weaknesses related to STI fragmentation, the efficiency of public spending, and talent retention.<sup>10</sup> Bulgaria's OECD accession process, with technical reviews expected to advance substantially by early 2026, offers an additional external anchor for reform. OECD assessments emphasize the need for integrated policy frameworks, robust monitoring and evaluation systems, and stronger science-industry linkages (OECD, 2024).

**However, external anchors cannot substitute for domestic institutional reform.** Despite recent legislative and strategic developments, Bulgaria's research and innovation governance remains fragmented, with overlapping mandates and weak accountability across ministries and agencies. The priority is therefore not simply the creation of a new standalone institution, but the effective implementation of the Law on Research and Innovation Promotion through clearly defined institutional roles, coordination mechanisms, and financial responsibilities. In this context, proposals to strengthen national coordination—such as establishing a high-level National Coordination Council for Research and Innovation under the Council of Ministers or a Deputy Prime Minister—should be prioritized to address persistent fragmentation and weak accountability in the governance of the STI system.

## REGIONAL GOVERNANCE

**Regional innovation strategies exist in Bulgaria but remain weakly embedded in practice.** The RIS3 2021–2027 identifies region-specific priorities, yet the vast majority of STI instruments and nearly all public funding continue to be managed at the national level (European Commission, 2023). Regional Partnership Networks were created to coordinate RIS3 implementation with local stakeholders, but they convene infrequently and lack real authority over program design or resource allocation. As a result, R&D and startup activity remains highly concentrated in Sofia—and to a lesser extent Plovdiv—while peripheral regions lag behind on human capital, firm capabilities, and absorptive capacity (World Bank, 2020b).

**Cohesion policy has supported the expansion of innovation-related infrastructure in Bulgaria but has had limited impact on reducing regional disparities in innovation capacity.** EU funds have financed clusters, incubators, and technology centers across regions; however, many initiatives remain largely supply-driven and weakly integrated with local SME demand and regional production structures. The ex-post review of Sofia Tech Park (European Commission, 2018) found that, while the park provided state-of-the-art research and innovation infrastructure, its contribution to wider regional spillovers was limited, with activities remaining ICT-focused and highly concentrated in Sofia. OECD (2024) similarly points to weaknesses in regional innovation governance, highlighting limited alignment between RIS3 priorities and actual program funding, as well as insufficient mechanisms for structured and sustained stakeholder engagement at the regional level.

10 [https://research-and-innovation.ec.europa.eu/news/all-research-and-innovation-news/commission-engages-bulgaria-strengthen-national-and-eu-ri-policies-2025-06-18\\_en?utm\\_source=chatgpt.com](https://research-and-innovation.ec.europa.eu/news/all-research-and-innovation-news/commission-engages-bulgaria-strengthen-national-and-eu-ri-policies-2025-06-18_en?utm_source=chatgpt.com)

7.

# Conclusions and recommendations

**Despite Bulgaria's strong entrepreneurial niches and ICT excellence, fragmented governance, financing gaps, and skills mismatches limit the diffusion of innovation beyond frontier firms.** A more coherent, capability-driven policy framework—linking finance, skills, and governance reforms—will be essential to achieve broad-based productivity growth. This final section details key areas for improvement in Bulgaria's innovation system:

**1. Modernize and streamline governance of the research and innovation system to overcome fragmentation, overlapping mandates, and weak accountability.** This can be achieved by effectively implementing the Law on Research and Innovation Promotion including the following actions:

- Operationalize the Law's governance and coordination framework by clearly defining institutional mandates, coordination mechanisms, and financial responsibilities across ministries and agencies.
- Establish a National Coordination Council for Research and Innovation with formal mandate-setting and monitoring authority under the Council of Ministers or a Deputy Prime Minister to align priorities across the Ministry of Innovation and Growth, the Ministry of Education and Science, the National Science Fund, the SME Promotion Agency (SMEPA), and EU managing authorities. The Council should streamline overlapping legal frameworks—particularly those linked to EU funding cycles—and oversee a centralized monitoring and evaluation (M&E) system to track performance and impact.
- Strengthen accountability by linking public funding to measurable results and ensuring governance continuity through transparent leadership selection and stable strategic priorities. This would enhance policy coherence, reduce duplication, and provide the institutional stability needed to implement Bulgaria's long-term innovation strategy effectively.

**2. Expand the financing ladder for scale-ups and intangibles.** The following measures would strengthen domestic value capture, reduce premature relocation of frontier firms, and enable more firms to scale within Bulgaria:

- Address the persistent financing gap between early-stage and growth-stage investment by establishing mechanisms that enable larger venture rounds for high-growth firms. Options include the creation of a national Growth Fund, capitalized with public

resources but professionally managed, and regulatory reforms that allow pension and insurance funds to allocate part of their portfolios to venture and growth equity, subject to prudent risk management.

- Modernize collateral frameworks to recognize intangible assets — such as software, patents, and data — as eligible under credit guarantee schemes.

**3. Strengthen human capital alignment with innovation needs.** Reforms in education and training should align skills supply better with the needs of an innovation-driven economy:

- Universities should strengthen STEM and digital programs, revise curricula in consultation with industry, and expand English-language and internationally oriented programs to attract talent.
- Scale up dual-VET models, ensuring stronger private-sector participation in curriculum design and work-based learning.
- Ensure lifelong learning and modular reskilling programs target SME employees in digital tools, management, and green technologies.
- Address braindrain through targeted incentives — such as competitive research fellowships, startup visas, and diaspora talent networks — to retain and attract skilled professionals.

**4. Improve science-industry collaboration and commercialization incentives.** Universities and public research organizations need clearer incentives and infrastructure for market engagement:

- Introduce performance-based institutional funding (with indicators for collaboration, contract research, and licensing), professionalize TTOs (stable staffing, IP expertise, non-project finance), and expand proof-of-concept schemes to de-risk early commercialization.
- Standardize IP-sharing rules and streamline contracting for SME-university consortia to cut transaction costs. Strengthening these linkages would accelerate the translation of research into marketable innovations, enhance firms' access to knowledge and technology, and increase the overall economic return on public R&D investment.

**5. Enhance regional innovation capacity outside Sofia.** Innovation remains concentrated in the capital. Strengthening regional innovation capacity would promote more balanced economic development, reduce territorial disparities, and enable a broader diffusion of innovation-driven growth across Bulgaria's regions:

- Strengthen regional implementation of RIS3 by giving Regional Partnership Networks decision-making authority within defined mandates and operational budgets to tailor instruments to local priorities.
- Back supplier-development and cluster-upgrading programs to plug regional SMEs into national/EU value chains, especially in green and digital domains
- Fund collaborative projects linking regional universities and firms while connecting national assets (e.g., Sofia Tech Park, INSAIT) to peripheral ecosystems.

**6. Foster a stronger culture of reinvestment, mentorship, and risk tolerance.** Strengthening this “give-back” culture would help sustain Bulgaria's innovation ecosystem and embed entrepreneurship as a driver of inclusive growth:

- Encourage serial entrepreneurship and reinvestment via targeted tax incentives and co-financed mentorship programs.

- Create structured diaspora engagement platforms for capital and know-how.
- Modernize insolvency and second-chance provisions to reduce stigma and support re-entry.
- Require publicly funded accelerators/hubs to embed mentoring and corporate-partnership models that spread entrepreneurial know-how into manufacturing, green, and deep-tech sectors.

# References

- Bulgarian National Bank (BNB). 2024. *Balance of Payments Statistics 2023*. Sofia.
- Bulgarian Private Equity and Venture Capital Association (BVCA). 2024. *Project Venture – Startup Ecosystem Overview*. Sofia: BVCA. Available at: [https://bvca.bg/wp-content/uploads/2024/02/Project-Venture-Startup-Ecosystem-Overview\\_date.pdf](https://bvca.bg/wp-content/uploads/2024/02/Project-Venture-Startup-Ecosystem-Overview_date.pdf)
- Cirera, X. and Maloney, W.F. 2017. *The Innovation Paradox: Developing-Country Capabilities and the Unrealized Promise of Technological Catch-Up*. Washington, DC: World Bank.
- ESM. 2019. *European Startup Monitor 2019*. Available at [https://europeanstartupmonitor2019.eu/ESM\\_2019.pdf](https://europeanstartupmonitor2019.eu/ESM_2019.pdf)
- Eurobarometer. 2022. *Entrepreneurship in the EU and Beyond: Standard Eurobarometer 96*. Brussels: European Commission.
- European Bank for Reconstruction and Development (EBRD). 2025. *Bulgaria Country Diagnostic: Productivity, Investment and Innovation*. London: EBRD. Available at [https://www.ebrd.com/content/dam/ebird\\_dxp/assets/pdfs/country-strategies/bulgaria/EBRD-Bulgaria-diagnostic-September-2025.pdf](https://www.ebrd.com/content/dam/ebird_dxp/assets/pdfs/country-strategies/bulgaria/EBRD-Bulgaria-diagnostic-September-2025.pdf)
- European Commission. 2018. *Reshaping the Functional and Operational Capacity of Sofia Tech Park: Ex-Post Evaluation Report*. Brussels: European Commission.
- European Commission. 2023. *Country Report: Bulgaria 2023; Programme for Competitiveness and Innovation in Enterprises (PCIE) 2021–2027*. Brussels: European Commission
- European Commission. 2024a. *Bulgaria 2024 Digital Decade Country Report*. Brussels: European Commission.
- European Commission. 2024b. *Digital Economy and Society Index (DESI) 2024: Bulgaria Country Report*. Brussels. Available at <https://digital-strategy.ec.europa.eu/en/library/digital-economy-and-society-index-desi-2024-bulgaria>.
- European Commission. 2025. *European Innovation Scoreboard 2025. Country profile Bulgaria*. Brussels: European Commission.
- European Investment Bank. 2024. *EIB Investment Survey (EIBIS 2024): Bulgaria Country Report*. Luxembourg.
- European Investment Bank 2025a. *EIB Investment Report 2024/2025*. Luxembourg. Available at: <https://www.eib.org/en/publications/20240354-investment-report-2024>.
- European Investment Bank. 2025b. *EIB Investment Survey (EIBIS 2025): Bulgaria Country Report*. Luxembourg.
- Eurostat. 2022. “Patent Applications to the European Patent Office by Priority Year and per Million Inhabitants” (Dataset). Luxembourg. Available at Available at: [https://ec.europa.eu/eurostat/databrowser/view/pat\\_ep\\_rtot/default/table](https://ec.europa.eu/eurostat/databrowser/view/pat_ep_rtot/default/table).
- Eurostat. 2023. “Gross Domestic Expenditure on R&D (GERD) by Sector and Source of Funds” (Dataset). Luxembourg. Available at: [https://ec.europa.eu/eurostat/databrowser/view/rd\\_e\\_gerdsc/default/table](https://ec.europa.eu/eurostat/databrowser/view/rd_e_gerdsc/default/table)
- Eurostat. 2024. *Science, Technology, and Innovation Indicators (Dataset)*. Luxembourg. Available at: <https://ec.europa.eu/eurostat/web/science-technology-innovation/overview>
- Eurostat. 2025. *Regional Gross Domestic Product and Employment by NUTS 2 Regions*. Luxembourg. Available at: [https://ec.europa.eu/eurostat/databrowser/view/nama\\_tor\\_2gdp/default/table](https://ec.europa.eu/eurostat/databrowser/view/nama_tor_2gdp/default/table).
- Fund of Funds (FoF). 2024. *Innovation Strategy for Smart Specialisation – Bulgaria, 2021–2027*. Sofia. Available at <https://www.fmfib.bg/en/knowledgehub/document/39/overview>.
- Fund of Funds. (FoF). 2025. *Launch of the Entrepreneurship Growth Fund under the Programme for Competitiveness and Innovation in Enterprises 2021–2027 (PCIE)*. Sofia. Available at: <https://www.fmfib.bg/en/news/355-fund-of-funds-signed-a-contract-for-%E2%82%AC40-m-in-public-resources-with-bayena-ventures-under-the-entrepreneurship-fund>
- Grover, A., Görg, H. and Vecchi, M. 2019. *Management Practices and Firm Performance in Emerging Economies: Evidence from the ECA Region*. Washington, DC: World Bank.
- Institute for Computer Science, Artificial Intelligence and Technology (INSAIT). 2025. *Annual Report 2025: Highlights and Spin-Off Activities*. Sofia.
- International Monetary Fund (IMF). 2024. *Republic of Bulgaria: 2024 Article IV Consultation*. Press Release; Staff Report. Washington, DC.
- Invest Europe. 2023. *European Private Equity Activity 2022: Country Breakdowns*. Brussels.
- National Statistical Institute (NSI). 2023. *Enterprises by Statistical Region (NUTS 2)*. Sofia. Available at
- OECD. 2018. *Inclusive Entrepreneurship Country Assessment Notes: Bulgaria*. Paris: OECD Publishing. [https://www.oecd.org/en/publications/inclusive-entrepreneurship-2018\\_59363ee0-en/bulgaria\\_if35117b-en.html](https://www.oecd.org/en/publications/inclusive-entrepreneurship-2018_59363ee0-en/bulgaria_if35117b-en.html)
- OECD. 2021. *OECD Reviews of Innovation Policy: Croatia 2021*. Paris: OECD Publishing.
- OECD. 2023. *PISA 2022 Results (Volume I–III): The State of Learning and Equity in Education*. Paris: OECD Publishing. Available at <https://www.oecd.org/pisa/publications/pisa-2022-results/>.
- OECD. 2024. *Strengthening the Innovative Capacity of the Public Sector of Bulgaria, OECD Public Governance Reviews*. Paris: OECD Publishing.

- SeeNext. 2022. *Pharma Industry in Bulgaria: 2022 Edition*. Sofia. Available at: <https://seenext.org/reports/pharma-industry-report-for-bulgaria/>
- Sofia Tech Park. 2024. *AI Factory (BRAIN++) Project Overview*. Sofia. Available at: <https://sofiatech.bg/en/news/sofia-tech-park-and-insait-are-selected-for-e90-million-eu-project-bulgaria-will-be-home-to-one-of-six-new-eu-ai-factories>
- StartupBlink. 2024. *Global Startup Ecosystem Index 2024*. Tel Aviv.
- Startup Heatmap Europe. 2022. *Annual Report & Country Profiles*.
- The Recursive. 2024. *State of AI in CEE Report 2024*. Sofia. Available at: <https://therecursive.com/future-of-ai-in-cee-market-report/>.
- wiiw, the Vienna Institute for International Economic Studies (wiiw). 2024. *Toward Innovation-Driven Growth: Innovation Systems and Policies in EU Member States of Central and Eastern Europe*. Vienna: wiiw. Available at: <https://wiiw.ac.at/toward-innovation-driven-growth-innovation-systems-and-policies-in-eu-member-states-of-central-eastern-europe-dlp-6998.pdf>.
- UNESCO (2023). *UNESCO Education Statistics*.
- WIPO (World Intellectual Property Organization). 2023. *Bulgaria: Country Profile – Intellectual Property Statistics*. Geneva: WIPO. Available at: <https://www.wipo.int/edocs/statistics-country-profile/en/bg.pdf>.
- World Bank. 2020a. *Bulgaria - Country Needs and STI Policy Mix Assessment*. Washington D.C.: World Bank Group.
- World Bank. 2020b. *Enhancing the Contribution of Bulgaria's Public Research to Innovation: A Survey-based Diagnostic*. Washington D.C.: World Bank Group.
- World Bank. 2021. *Bulgaria Functional and Governance Analysis*. Washington D.C.: World Bank Group.
- World Bank. 2023a. *Enterprise Surveys: Bulgaria 2023 Country Profile*. Washington D.C.: World Bank Group.
- World Bank. 2023b. *Country Economic Memorandum: Reaching the Next Level of Convergence*. Washington D.C.: World Bank Group.
- World Bank. 2024. *Subnational Business Ready in the European Union 2024: Bulgaria*. World Bank. <http://hdl.handle.net/10986/42334>

