



GLOBSEC **Danube** **Tech Valley** **Initiative** **Innovation** **Report:**

Building an Innovation Ecosystem in the
Central and Eastern Europe (CEE) Region

GLOBSEC Danube Tech Valley Initiative (DTVI) Innovation Report:

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This research report has been developed by the GLOBSEC Policy Institute Team in close consultation with the GLOBSEC Board of Directors. (Lead-authored by Soňa Muzikářová, chief economist at GLOBSEC Policy Institute, with contributions from Gordon Bajnai, Partner, Chairman of the Advisory Board and Global Head of Infrastructure, Campbell Lutyens; Vazil Hudák, Vice-president at GLOBSEC; and Willi Molterer, Chairman of the Board, and former Austrian Vice-Chancellor. Research assistance was provided by Simona Talačová).

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Executive Summary

The Momentum

The DTVI is taking place at a critical juncture for European policymaking. Russia's invasion of Ukraine has initiated a new geopolitical era, with the Kremlin's extraordinary use of force spurring Europe to transition away from its energy dependence on Russia. This geopolitical backdrop follows two years of turbulence fuelled by the COVID-19 pandemic. The moment presents **a rare historical opportunity for Europe - and particularly the Central and Eastern European (CEE) region** – to broadly transform its growth strategy to achieve greater sustainability and prosperity. If Europe adopts a prudent policy course, it can promote employment, enhance productivity, improve the quality of life, and transform the continent into a centre of talent and innovation.

The impetus is especially pressing for much of the CEE region (*Slovakia, Austria, Czechia, Hungary, Bulgaria, Romania, Slovenia, Serbia*) – these countries have attained middle-income status over the past couple decades. Yet **innovation remains key** if they are to further unlock their international competitiveness vis-à-vis global economic rivals

and lay down the foundations for more sustainable and smarter future economic growth models. Regular GLOBSEC assessments corroborate the finding that the CEE region faces a sizeable innovation gap compared to its western European counterparts. This gulf holds true for both the aggregate and granular level innovation performance of the CEE region. The GLOBSEC benchmarking tool, the CEE Strategic Transformation Index¹, and other indicators feature comprehensive metrics spanning: education outcomes and conditions, human capital quality, number of researchers, citations, knowledge-intensive firm share, innovation outcomes such as patents and designs, and access and volume of financial capital. The aggregate results of these indicators speak uniformly and attest to the region's laggard performance on innovation vis-à-vis other European regions.

The innovation metrics are firmly anchored in the strategic objectives of the European Union (EU), as stipulated by European Commission President

Ursula von der Leyen. The DTVI, to this end, is seeking to further reinforce progress herein at the regional level.

Russian aggression in Ukraine has placed an unprecedented global spotlight on the region.

The conflict has showcased the ability of CEE countries to collaborate with peers, deliver aid during a humanitarian crisis, and present a united and firm front against an aggressor. It, furthermore, underscores the heightened potential for the region to leapfrog and emerge anew as a centre for innovation, a magnet for international capital, and a laboratory for cross-border collaboration, mutual assistance, and intensified exchange of skilled labour.

Why the Danube Region?

The CEE region's shared endowments, core competencies, and flagship industries provide **a policy opportunity on the path to tech-driven transformation**. The countries in the Danube Valley represent **a unique combination of traditional industries and corporations as well as new technological start-ups**. They further boast economic, societal, and demographic circumstances highly compatible with next-generation technology and Industry 4.0. To leverage these favourable circumstances, the Danube Region needs to ensure that its potential is not constrained by the generally small and limited market sizes of countries. Through cross-border coordination that the DTVI can facilitate, the region notably can tap broader scale in product markets, labour markets, pools of talent, capital, and innovation culture .

The CEE retains significant advantages which should be leveraged and strengthened in achieving next-generation innovation goals. Many Danube Valley economies are underpinned by strong manufacturing sectors, particularly in the automotive industry and mobility. Given the sizeable manufacturing intensity of medium-tech industries, the export intensity, significant cohorts of STEM graduates in some cases, and shared challenges (such as population decline), the CEE region is well-positioned to embrace underlying Industry 4.0 technologies and other productivity-enhancing systems. For the time being, CEE countries possess relatively fast internet connection speeds, making them an attractive place to host advanced tech start-ups. The region could especially emerge as a global leader in the **information and communication technology, next-gen mobile technologies (6G), and e-mobility industries**. The EU holds an edge as the global trendsetter of the green transformation, yet the CEE has maintained a sluggish pace in this area. But leap-frogging and early specialisation in emerging technology sectors

such as green-tech, clean-tech, and cyber-security provide an enticing opportunity for cross-border cooperation. Against this backdrop, the CEE could be a significant beneficiary of emerging technologies such as AI, automation, and even FinTech2, 3.A GLOBSEC analysis¹ indicates that private sector digitalisation, the green economy, reforms towards Industry 4.0, and common risk capital pool (especially early-stage developments) could be common enablers and denominators for a shared regional policy approach to innovation in the Danube region.

Why GLOBSEC?

GLOBSEC is a longstanding advocate for close cooperation and integration of regional economies be that pooling funds under the Recovery and Resilience Fund (RRF) umbrella, putting regional development banks on the same footing, and/or leveraging regional scale regarding common capital markets, venture capital, equity capital, human capital, and innovation culture and third spaces. The DTVI is a case in point that epitomizes GLOBSEC's enthusiasm towards upgrading the region's standing in Europe and the global stage and (re)gain CEE a reputation as Europe's economic growth engine. The region has indeed previously been able to consistently achieve growth rates double the EU average and record steep real economic convergence gains.

Political Support

The DTVI is aligned with the declared commitments of respective governments in national Recovery and Resilience Plans that have been approved by the European Commission. These programmes are directed at making the region's economies more innovative, ecologically-oriented, and smarter, increasing the quality of domestic talent pools and allocating funds to these policy ends. The benefits of innovation-driven growth in the Danube Valley for the regional economy and populaces are broadly recognised. The DTVI enjoys **political backing from the Slovak and Austrian prime ministers**, lending it legitimacy and political capital at the highest levels of government. GLOBSEC intends to support the objectives of the Slovak and Austrian governments through developing and implementing, in close cooperation and consultation with these governments, a four-year partnership programme in both countries (via the DTVI).

The DTVI: A Leading Cross-Border Platform

The DTVI will be a **leading open, voluntary, and inclusive platform** facilitating bottom-up cross border interactions and initiatives among diverse stakeholders in the Danube Region including, among others, local and regional governments, research institutes and universities, start-ups, and corporations. The primary goal concerns bolstering and accelerating the innovation potential of the Danube Region through this cooperation.

To this end, lessons learned from prior Danube initiatives should be heeded: it is vital that the DTVI benefits from existing best practices, initiatives, structures, and programmes and actively seeks out ways to bridge and connect them. There is, in fact, untapped value in opening up existing nationally defined start-up associations (other entities) and promoting cross-border links. The DTVI, importantly, is not oriented towards replacing existing cross-border initiatives in the region or competing with them but rather providing a “horizontal platform” that will connect and link them.

The “Hows”

Laying down foundations for an innovation ecosystem is not a trivial matter. Innovation ecosystems are **intricate and complex inter-connected organisms** – they consist of multiple pillars (Box 1) that all need to be developed if the ecosystem is to function effectively. The arrangements must be entrepreneur-centred (as opposed to government-centred) from the start, oriented around the local context (rather than merely emulating the Silicon Valley and other successful regions), and steered towards supporting high-growth start-ups and scale-ups as dominant sources of innovation and their new value creations. Governments, policies, and regulation should focus on providing an enabling backdrop (Box 2).

DTVI activities and goals should, moreover, be strategically targeted around areas where the region **can cooperate effectively without concerns about in-region competition**. DTVI activities should, in other words, prioritize areas where the benefits of regional cooperation considerably exceed any advantages derived from putting national concerns first. To this purpose, open and honest dialogues at the government level should help clarify priorities. An **impact-interest matrices** should be constructed to identify the most advantageous focal points for every pillar and activity – these indicators would be aimed at catalysing the competitive edge of the entire region compared to the rest of the world. The DTVI, in this way, can serve as

a platform for identifying shared strengths of the region – a key element to realizing its potential.

Due to the aforementioned complexities, we envision a **participative** process that **converges at the frontier of bottom-up expertise of key real economic actors** and top-down expertise of governments and legislatures. GLOBSEC has brought together **public and private stakeholders under the DTVI umbrella** – thought leaders in the arena of CEE innovation – to fast track progress and forge meaningful change. The organization will draw on its expertise in convening relevant actors, optimising itself as a dialogue hub, connecting stakeholders and ideas, and increasing awareness of key policy issues throughout its dense network of high-level CEE policymakers.

The success of DTVI rests on appropriate priority- and stakeholder-identification and sequencing. GLOBSEC, therefore, has organized (and will continue to gather expert views) from a series of multi-stakeholder brainstorming sessions, distilling the ideas of accomplished regional innovation leaders from diverse backgrounds, professions, and organizations. During these public-private consultations, key Danube innovation actors have shared their insights and recommendations with a view towards the identification of priorities, key principles, initiatives, the shape of the private sector role, policy aims, risks, and opportunities for the project. These contributions are synthesized in the forthcoming report.

The DTVI is led by **its Steering Committee** composed of public officials, policy experts, innovators, financiers, and third and private sector leaders. Intellectual and financial partners for the DTVI will include leading regional financial institutions, international organizations, governments, and firms.

The Way Forward

This report serves as a founding document for the DTVI. It presents the key findings from a cross-section of existing relevant literature, expert insights synthesized during brainstorming sessions organized by GLOBSEC, and data corroborating the state of affairs in the CEE region.



BOX 1: INNOVATION ECOSYSTEM PILLARS – GENERAL OVERVIEW

Financial capital

- ▶ Venture capital
- ▶ Private equity
- ▶ Angel investors
- ▶ (Access to debt)

Human capital

- ▶ Management talent, leadership
- ▶ Technical talent
- ▶ Availability of outsourced talent
- ▶ Major universities as catalysts/hubs for idea formation and talent supply
- ▶ Availability of workforce (with pre-university education, uni-educated, specifically trained)
- ▶ Access to immigrant workforce

Markets

- ▶ Accessibility of domestic markets
- ▶ Accessibility to foreign markets

Regulatory framework

- ▶ Ease of starting a business
- ▶ Tax incentives
- ▶ Business environment
- ▶ Access to infrastructure (digital and physical: broadband, telecom, rail & road)

Support systems and culture

- ▶ Networks (entrepreneurial peers)
- ▶ Incubators/accelerators
- ▶ Mentoring
- ▶ Professional support services
- ▶ High societal risk tolerance (encouraging risk-taking)
- ▶ Role models, success stories, positive image of entrepreneurship
- ▶ Preference for self-employment
- ▶ Research culture
- ▶ Celebration of innovation



Financial Capital

Financial Capital in Innovation Literature

Access to appropriate and sufficient finance is one of the most important factors contributing to productive and sustainable innovation ecosystems. The development of robust innovation ecosystems are dependent on a range of financial institutions providing various financial products and services to innovative businesses embarking on their journeys (from idea to impact and start-up to scale-up). These institutions include (but are not limited to): accelerators/incubators, angel investor networks, private foundations, impact investors, venture capital firms, private equity firms, crowd-funding platforms, public/semi-public funders, and banks.⁴

The pandemic has impacted the financing of innovation-oriented projects around the globe. Investors, facing economic uncertainty, have become more hesitant, selective, and risk-averse – the net effect is the reduced availability of finance. Many start-ups indeed reported difficulties in accessing financing during the pandemic.⁵ When there is a lack of financial capital flowing from private investors, governments can decide to provide

state financial support to drive innovation. To succeed, these instruments should be as neutral and transparent as possible and governments must ensure that funding allocations are steered by true innovative and commercial potential. Overly generous schemes may merely provide easy money to uncompetitive projects – this approach could spur support for innovation ideas and businesses that appear appealing on the surface but that, in fact, hold minimal likelihood of commercial success.⁶

Innovation projects can encounter difficulties in accessing financing, either due to the high risk associated with the intangible assets they often produce or technological and market uncertainty. Different forms of financial investments are available based on the particular stage of the innovation process a respective project finds itself. According to a World Bank report, government support in the form of public funding and grants is most relevant with respect to high-risk projects in their early stages of development. The second stage of start-up development, meanwhile, typically witnesses several forms of finance become available



including business angels in the form of equity or convertible loans, early-stage venture capital funds, crowdfunding platforms, accelerators, and large corporations. The public sector can also support second stage development through the provision of grants and loans. If the following scaling-up stage still encompasses a large amount of risk, venture capital is a typical source of funding. If the risk is low for a scale-up, bank debt is appropriate along with support from business angels, private equity funds, public markets, or corporates. The various forms and shapes that financing for innovation projects assume, importantly, can also overlap across the different stages of development.⁶

The European Innovation Council published its insights on European innovation ecosystems via a platform through which experts and stakeholders shared their opinions on financing. They agreed that early-stage funding is relatively accessible at local and national levels. As innovative companies seek to raise more mature funds to scale up their operations, however, the national option becomes less viable. More opportunities for financing, at this point of the process, rather lie at the European level. It is important that firms, in this regard, already attain necessary funding to develop their innovations from the concept stage to the scaling-up phase. Providing large amounts of finance to support the early stages of the innovation process may not translate into rapid economic growth if young, innovative firms cannot secure access to further funding to commercialize their innovations. Therefore, governments need to look at the full “funding escalator” to ensure finance is available at all stages of the innovation process.⁶

A recent study claims publicly backed venture capital funds play a greater role in mobilising the regional innovation ecosystem compared to private venture capital funds. Publicly backed venture capitalists interact with the different players of the regional innovation ecosystem to a greater extent than their private counterparts and this activity appears to spill over to non-financial related organizations including university incubators, research institutes, and business support organizations. These interactions may bolster the links between the organizations and the companies they support to the venture capital industry more broadly, thereby improving the overall investment readiness of the companies. Although public venture capital funds foster greater interaction, they also tend to record relatively less success as measured by the financial performance of the funds.⁷

Venture capital and private equity support remain integral to innovation businesses on their journeys. Venture capital is needed to transform

innovative start-ups into long-term sources of jobs and growth. As a response to the pandemic, governments in countries with weaker venture capital ecosystems could be prudent to consider launching dedicated innovation funds for seed and early-stage financing. These measures may support the transition to future sources of economic, social, and environmental value. Israel’s Yozma is emblematic of the types of public-private funds-of-funds that can provide the foundations for a broader venture capital ecosystem.⁸ The government’s Yozma programme provided venture capital funds which, in the period 1992–1997, raised over \$200 million. In 2009 there were 45 such Yozma funds managing \$3 billion of capital. The Economist reported there are now more than 100 venture capital funds as part of the programme. Singapore has similarly set up a public venture capital fund whose various measures have contributed to earning it first place in the World Bank listing for the ease of doing business.⁹

Current State in the CEE Region and Policy Opportunity

The increasing wealth of the CEE region, its proximity to Western Europe, and a culture of business investment all indicate that the CEE region is uniquely placed as an ecosystem for start-ups to thrive. But the limited size of local markets and limited access to capital are proving a formidable challenge to start-ups emerging in the region.

Some CEE countries have limited access to traditional funding, particularly for innovative small and medium-sized enterprises (SMEs). Well-functioning capital markets, that said, are an important channel for allocating capital to firms with the greatest potential for productivity gains from the rollout of innovative processes and the commercialization of new technologies¹⁰. But European capital markets remain fragmented and shallow, and CEE capital markets even more so. In aggregate, the stock market capitalization of Europe stood at 52% of GDP in 2018, only slightly higher than Israel (50%) and significantly lower than Korea (82%), Japan (107%) and the United States (148%)¹¹. The gap in capital access is even starker among start-ups. EU companies rather are significantly more dependent on domestic bank loans for financing than firms in peer economies, disadvantaging high-risk ventures in relative terms. While bank loans may suffice for technology adoption, they are typically not a suitable option for innovation (i.e., R&D commercialization or entrepreneurship)¹².

When it comes to early-stage finance, CEE countries have not been able to attract the same amounts of venture capital as their Western Eu-



European partners. In 2017, the CEE region accounted for only 2% of total European venture capital. The average venture capital investments in CEE (at €600,000) were significantly smaller than in Western Europe (€1.7 million). Most venture capital funding comes from government-backed funds, particularly from the EU.¹³ European funds have indeed considerably facilitated emerging venture activity in EU Member States. But venture activity in the CEE region remains especially paltry at less than 1% of global investment volume. The only country in the region with high venture activity in relative terms is Estonia, with around \$60 of venture investment per capita (compared to \$185 in the USA and \$33 in France). Only a few international venture capitalists come to CEE **due to the relatively small size of the local markets and, even more often, a lack of information about these markets and opportunities in them.**

In some cases, moreover, international investors are deterred by unfavourable local political and/or legal contexts. Some foreign investors, however, have enjoyed significant returns following their investments in start-ups from the region.¹⁴ Investment in the region has been further constrained by the sizeable number of state-owned entities. The creation of new, more nimble business models, that said, has opened opportunities for entrepreneurs to start companies and build products outside traditional oligarchies. These developments, in turn, have attracted those willing to invest in the region.¹⁵

Measures are now needed to strengthen overall policy coherence to ensure longer-term stability enabling investors, businesses, and research institutes to develop sustainable strategies. Steps in this direction will aid countries in developing innovation capacity more strategically and create positive spillover effects in the wider economy.¹³ Fostering capital market development and expanding the set of capital providers that are able to finance and support innovative companies is key to supporting innovation processes in the region.¹⁶ **Based on this prevailing status quo,** the following tangible projects may prove beneficial in addressing underlying weaknesses through the GLOBSEC Danube Tech Valley – Financial Capital Stream.

Project Ideas under the GLOBSEC Danube Tech Valley – Financial Capital Stream

- ▶ **The Danube Cross-border Private Equity (PE) Fund:** Drawing on the premise that the region's enterprises suffer from a shortage of growth capital more than seed capital, GLOBSEC would partner with the European Investment Bank (EIB) or the European Investment Fund (EIF) to structure a dedicated growth equity fund to provide capital for high-growth tech small and medium-sized enterprises (SMEs) beyond the venture capital stage and with a "cross-border dimension" (i.e. occupying a highly promising market space, relevance across the region). These targeted firms would encompass those that are potentially preparing for an initial public offering (IPO) or post-IPO. The EIB/EIF partnership should play a prominent role and facilitate the channelling of EU funds to priority areas.
- ▶ **The Danube National Recovery Plan Hub:** National recovery plans under the umbrella of the EU Recovery and Resilience Facility could be mapped, compared, and pooled to achieve common strategic objectives. It would be prudent to compare investments and reforms and identify shared win-win strategies focused on coordinating these actions to achieve common regional goals. The product of the Hub would include a comparative analysis of CEE recovery plans, high-level political discussions of these findings, and a multi-stakeholder action plan for implementation.
- ▶ **The Danube Region Fintech Sandbox:** The pace of digitalisation and innovation in the financial sector are increasing. We should strive to promote this process in line with the "same activity, same risk, same rules" principles to ensure that existing (and new) regulation does not unnecessarily hinder the development of technologically innovative solutions and processes. Supporting the creation of new (also cross-border) access channels for business and investors through the reduction of transaction costs and other barriers will benefit the development of the DTVI. To promote these developments, a joint sandbox for testing and adapting compliance to regulations for innovative companies in the region should be set up. Additionally, a sandbox sends a strong signal to potential innovators and venture capitalists about the cooperative willingness, innovative spirit, and general support of regional regulators and lawmakers.



- ▶ **Digital Economy Alternative Funding Sources Platform:** For very early-stage software/e-commerce projects, there is increasing funding availability from digital platforms in the form of crowdfunding and peer-to-peer services via blockchain and tokenization. These funding sources are increasingly important and complementary by bridging initial capital needs for innovation prior to the venture. They also foster greater community engagement in the projects, which, in turn, cross-fertilize the entrepreneurial ecosystem and link it globally.
- ▶ **The Danube Region “Green & ESG-Thematic Bonds” Support Structure:** The competitiveness of the region will be enhanced by strengthening capital markets as part of an integrated, open, deep, and liquid European Capital Market. These aims would be bolstered through development and promotion of green and ESG-related bonds (e.g., Sustainability-Linked Bonds [SLBs] for SMEs and corporates, which are particularly flexible) at the national and regional levels, especially for corporate issuers. GLOBSEC could track relevant ESG debt issuances and related market appetite to ensure the region is abreast of the latest developments. Important at this juncture are non-financial reporting standards (especially for climate related disclosures) and frameworks for sustainability ratings. A taskforce should also be established to address issues concerning the dissemination of information and best practices and the provision of advice on addressing regulatory and non-regulatory barriers - completion of this mandate would further foster the development of regional bond markets.
- ▶ **The Danube Capital Markets Single Access Point:** Increased access to equity and debt markets for enterprises, and notably SMEs, should be facilitated. An important element to this includes the creation of a single access point for the DTVI where financial information of companies could be housed. Creating transparency and comparability will stimulate investment (including cross-border investment). This initiative should deliver a cross-border market index accompanied by other information infrastructure: additional rankings of top start-ups and SMEs, among other entrepreneurial entities, will be developed based on different metrics. The ratings will also examine different sectors in the region (see point 6 under Project Ideas under the GLOBSEC Danube Tech Valley – Support Systems and Culture Stream).
- ▶ **The Danube Primary Education Financial Literacy Initiative:** To improve the financial literacy of CEE youth, it is important to institutionalise financial literacy and basic economics in school curricula as a mandatory part of social studies. This stream would involve mapping current conditions and devising a common action plan. The proposal should be presented – along with policy suggestions – to the education authorities in the region. Financial literacy programmes would be accompanied by a CEE Financial Literacy Regional Competition for high school students and include attractive prizes (such as a visit to a unicorn in Silicon Valley).



Human Capital

Human Capital in Innovation Literature

Human capital is generally understood as the key and most important element promoting long-term economic growth. It is the talent within a region (or attracted to it) attuned to the relevant education and experiences necessary for either innovation or entrepreneurship or both.¹⁸ Although a holistic approach directed at building ecosystem pillars must be equally emphasized, highly innovative ecosystems are said to be “human-centric”, with a primary focus on people (above financial capital, R&D, industry, regulations, or other key factors). Most knowledge generated through innovation is tacit, intangible, and embedded within human capital; it, therefore, provides a stock of invaluable knowledge and skills underscoring that innovation is people-driven (rather than merely technology-steered).¹⁷ **A pool of talented human capital can be created by investing in infrastructure such as schools, quality higher education, and R&D institutions.** Investment in human capital, for example, through higher wages for skilled people lends support to R&D activities - effective R&D indeed often depends on a skilled workforce. Another strategy revolves around

attracting talent from other regions and employing these workers within the innovation activities of the country or region. The World Bank has underlined the importance that well-functioning immigration systems be designed and implemented as they facilitate skilled professionals and management to be brought in from abroad.⁶ The recruitment and retainment of talent can be bolstered by the development of inclusive approaches that remove frictions dissuading new people to join in.¹⁹ At the same time, the implementation of initiatives aimed at reducing brain drain and nurturing and retaining skilled workers are equally important.¹⁷

Education systems and universities play a central role in the development of Europe’s innovation ecosystems. Universities spur innovation and knowledge creation through their research activities – they also play a crucial role in developing, attracting, and retaining human talent.⁶ Universities, together with research centres, are co-innovators of 70% of the innovations derived from Horizon2020 projects.²⁰ Education systems can provide individuals with specific training in a



wide variety of scientific and technical disciplines, entrepreneurial skills, and knowledge. To cultivate the skills necessary for innovation, there is a distinctive need for training geared towards moving from ideas to impactful actions. This focus set includes skills such as prototyping and design to commercialization and expertise in production and manufacturing of all types.¹⁸

For many years, the perception held that entrepreneurship was a personality trait. But we now recognise that entrepreneurship can be taught – universities in particular can foster entrepreneurial cultures and enhance entrepreneurial mentalities throughout society. Highly innovative countries have improved their education systems to foster entrepreneurial and creative thinking from early on.¹⁷ In the UK, for instance, recent guidance provided to the government has suggested widening the availability of optional courses in entrepreneurship across numerous undergraduate programmes. Singapore’s Summation Program, for its part, supports apprenticeships in deep tech start-ups.¹⁸ Apart from students - staff and researchers need to be part of entrepreneurial programmes too.¹⁹ Universities can also organise start-up conferences and events that promote interaction with other agents of the ecosystem to foster greater informal networking and meet-up encounters. In fact, one of the largest start-up events, *Slush*, is organised by university students.¹⁹

There is always room for improvement for education systems to better respond to the needs of labour markets, assist economies in avoiding skills gaps, and ensure that adequately trained human capital is available to support innovation activity. The government should put education front and centre in its efforts to develop innovative capacities and entrepreneurship. It is expected, over the upcoming years, that numerous countries across all stages of development will be spearheading major systemic changes in their national education systems.²¹ Finland, by way of illustration, has already implemented university reforms and is one of the few countries that has developed national guidelines for the provision of entrepreneurial education. Aalto University, for example, has assumed a greater role as a leader in the local innovation ecosystem. Bottom-up entrepreneurial activity from staff and students is integral to these initiatives and so too the formation of strategic links with other actors in the ecosystem. As an enabler, reforms in this direction also create more conducive environments for attracting foreign talent. The US government, for example, has established a temporary employer-sponsored work visa system and dedicated categories for permanent residence granted to persons with extraordinary ability and outstanding professors and researchers.²⁰

Current State in the CEE Region and Policy Opportunity

The 2021 GLOBSEC Strategic Transformation Index identifies education as one of the relatively weakest structural areas (not only relative to the European average but even based on lacklustre regional standards). These findings come despite the fact that education is a fundamental building block to achieving vibrant innovation-led growth in the region. The current CEE education systems are structured to fit the manufacturing-fuelled macro models of the past, not matching the nowadays labour market needs. The standards of the education systems in some CEE countries has further deteriorated over time.¹ **This lacklustre standing is partly counter-intuitive, considering the solid performance in some human resource metrics** including the number of new doctoral graduates, share of the population with tertiary education, participation in lifelong learning programmes, and access to digital infrastructure.²² But the mere number of graduates may not speak to the overall quality of this education.²³ The region is also known for producing scores of graduates equipped with technical and IT skills - the post-Soviet education systems of the region have put particular emphasis on math, science, and engineering. Compared to Western European countries, the abundant availability of engineering talent and lower labour costs in the CEE region attract investor and founder interest.¹⁵ Six CEE countries ranked among the top 20 of 50 countries across the globe in the category of developer skills.²⁴ The broader picture, however, reveals a population overall lagging in basic digital skills even as many highly specialised professionals take on employment in various tech areas. Apart from honing basic and more elaborate technical skillsets, strengthening the focus on communication, creativity, critical thinking, and leadership skills should also be prioritised. A robust set of hard and soft skills will enable individuals to seize opportunities for innovation and economic transformation.²⁵

The region further faces the challenge of brain drain (or the emigration of skilled individuals to Western Europe). Due to uncompetitive wages, a significant number of people relocate to Western Europe in the pursuit of higher wages, leaving CEE countries relinquishing a core element of a healthy innovation ecosystem to places abroad.¹⁵ If left unaddressed, a shortage of human capital could become a major impediment to the development of the region’s innovation ecosystems.²⁴ Active labour market policies can help ease labour market shortages by improving job matches and bringing the inactive population into the job market. Public policies directed at reskilling and upskilling



workers can also help increase the availability of skillsets in demand in an environment of rapid digitalisation. CEE countries need to strengthen education and participation in life-long learning programmes and boost adult learning to respond to the pressures of digitalisation in the labour market. These initiatives all need to be combined with measures targeted at strengthening the quality and inclusiveness of education.²⁵ **Based on the prevailing status quo, the following tangible projects may prove helpful in addressing underlying weaknesses through the GLOBSEC Danube Tech Valley – Human Capital Stream.**

Project Ideas under the GLOBSEC Danube Tech Valley – Human Capital Stream

- ▶ **The Danube “MIT” Campus:** The Danube innovation ecosystem would be significantly bolstered if the region could attract Ivy-level and/or globally top-ranked education institutions to the region. This would include the establishment of a campus in the Danube Valley and actions to supply the region with necessary managerial and technical talent. It would further involve the institution partnering with research institutes and attracting top-notch educators and capital. The presence of a major leading university would serve as a catalyst for innovative idea formation and a steady talent supply.
 - ▶ **The Danube Region Migration Programme:** To retain talent within the EU and rapidly improve the availability of talent in the CEE region, the Programme should serve as a single access point for the immigrant workforce to involve themselves in start-ups and scale-ups. This is especially paramount against a back-
- drop of talent circulation spurred by the war in Ukraine. Tangible CEE government backing is important to fast track immigration procedures and work permits from third countries, specifically targeting highly educated or highly specialised migrants.
- ▶ **The GLOBSEC – European Investment Bank (EIB) Advisory Hub:** The comprehensive Advisory Hub is expected to facilitate knowledge transfer with respect to mobilizing capital, the pitching of projects (“Masterclass on Pitching”), market assessment, and regulatory measures. The initiative would contribute to the mapping of different legislatures across the Danube region and other relevant aspects of getting new innovative ideas off the ground. Its success will be underpinned by the EIB’s muscle in advisory matters (under the patronage of the EIB’s Vice President, Ms Liliana Pavlova’s Office), especially with regards to financing innovation and related investments.
 - ▶ **The GLOBSEC Bottom-Up Hub:** The proposal for a Hub draws on a recent GLOBSEC analysis¹ examining the mechanisms through which bottom-up approaches to human capital generation can quickly and effectively fill the void left by top-down education reform efforts. The Hub will serve as an important platform to pool existing bottom-up reskilling and training initiatives in the Danube region - other players can either directly tap into, join forces with, or gather inspiration from these outputs and transpose them into their own spin-offs. The idea behind the Hub is to improve the quality of the *existing* workforce, providing it with specific, market-relevant, and needs-based skills and competencies and forging results quickly.



BOX 2. THE DANUBE TECH INNOVATION ECOSYSTEM – GUIDING PRINCIPLES

Based on multiple rounds of brainstorming conducted in liaison with regional innovation leaders and a review of lessons learned and the relevant empirical literature, GLOBSEC has derived several guiding principles for DTVI to succeed in forging a functional innovation ecosystem in the Danube region:

Entrepreneurship v. Policy

- ▶ The DTVI Ecosystem shall be **entrepreneur-**, not government-, **centered** and focus on engaging the private sector from the start.
- ▶ Governments, policies, and regulation provide an enabling or disabling context/conditions. Government should primarily focus on **reforming the rules**: legal, bureaucratic, and regulatory.
- ▶ **The “Dutch Entrepreneurship Paradox”**: Entrepreneurship alone cannot be equated with innovation: (a.) The rise of entrepreneurship does not automatically go hand in hand with increasing innovativeness, and (b.) self-employment and small business activity is not the same as entrepreneurship.
- ▶ Emphasis should be placed on increasing the development of (young) **high-growth entrepreneurial firms** - this type of entrepreneurship is an important source of innovation, productivity growth, and employment and/or to tech start-ups.
- ▶ **New value creation** for CEE societies (and beyond) lies at the heart of innovation.

The Ecosystem

- ▶ Stop emulating the Silicon Valley and build the ecosystem **around local conditions**.
- ▶ Recent empirical studies on entrepreneurial ecosystems reveal **two dominant models of entrepreneurial ecosystem emergence** (OECD, 2013):
- ▶ One exceptional firm expands rapidly and creates an entire ecosystem alongside it. The single firm leaves a strong imprint on the nature of the ecosystem.
- ▶ A group of successful entrepreneurs (“start-up community” and more dispersed actors) cash out and reinvest in the ecosystem: acts as connectors, and provide role models to emulate.
- ▶ **“The Anna Karenina Principle”** applies: A deficiency in any single one of a high number of factors can lead to failure when it comes to innovation ecosystems (i.e., all pillars are created equal and must be maintained for the innovation ecosystem to function). A recent World Economic Forum (WEF) study concludes that accessible markets, human capital, and finance are the most important pillars for the growth of entrepreneurial companies.
- ▶ Innovation takes place in an **interdependent community** of actors (i.e., clusters, industrial districts, innovation systems, and learning regions). Innovation by entrepreneurs necessitates experiments in production, distribution, and consumption. This requires deep expertise and close interactions between sets of expertise.
- ▶ Beware of conflating **cause and consequence** (e.g., financial capital being key to the birth of the ecosystem as opposed to resulting from it)
- ▶ Tackle **cultural shifts** intentionally and head-on.
- ▶ Do not over-engineer clusters (instead promote organic growth).

Markets

Markets in Innovation Literature

The innovation ecosystems of countries should be systematically developed and shaped to close market gaps.²⁶ The strategy should clearly outline areas - or focus sectors - in which the country will focus its efforts towards creating innovations. The innovation strategy must be forward-looking and ambitious. They may include the promotion of innovations in areas that have not yet achieved mainstream status though that will shape the global economy of tomorrow and provide the country a competitive head start (such as Singapore's innovation focus on biotech). It could also involve addressing cross-border challenges (such as climate change).²⁶

To ensure long term economic growth, countries should define the key priorities of their innovation strategy and identify the key markets they want to invest in.⁸ The number of chosen focus sectors normally correlates with the economy's size but rarely exceeds four to six areas. Not surprisingly, many countries choose at least one sector in the areas of technology, energy, water, and the environment. Singapore, for example, prioritized four focus sectors in its Research Innovation Enterprise (RIE2020) plan: Advanced manufacturing, urban solutions and sustainability, health and biomedicine, and services and the digital economy.²⁶ Governments may wish to channel their funding to already existing research pro-

grammes and funding schemes within the country rather than designing new ones. At the same time, long term economic growth is only possible through investing in projects that generate economic growth while safeguarding the planet, empowering people, and strengthening communities and institutions.⁸

In addition to financial and human capital, innovation activity is largely supported by proximity and access to domestic and foreign markets.²⁷

The size of the potential market for innovative products, processes, or services also impacts incentives to innovate.²⁸ This scale determines the types of resources that innovative businesses can gain access to and the market opportunities that ultimately shape success or failure. Strengthening the access of innovative businesses to relevant markets enables them to promote and test demand for their products/services and therefore enhances their prospects for achieving success by reaching impact at scale. Governments, the private sector, and development agencies can all play important roles in facilitating innovators' access to domestic and foreign markets.⁴



Networks can help innovators expand their market reach, connect with domestic or foreign markets through B2B or public-private partnerships or gain intimate knowledge of markets and customers. Wider global linkages play an important role in the development of innovation ecosystems and provide innovators with access to relevant information on tariffs, legal requirements, and other conditions that may constrain or enable their access to foreign markets.²⁹ Businesses also seek to build networks with external partners to access more specialised knowledge and assets not available locally. These so-called global pipelines are seen as being particularly important in the early stages of ecosystem formation, providing access to markets, resources, and knowledge.⁴

Current State in the CEE Region and Policy Opportunity

Since individual domestic markets of most CEE countries are relatively small, innovative companies set their goals to meet the needs of the European market from an early stage. The close proximity of CEE countries to Western Europe's markets provides a particular advantage, lending innovative businesses from CEE a global focus from early on (a potential advantage compared to other ecosystems in the world that start out primarily locally).³⁰

Based on this prevailing status quo, the following tangible projects may prove beneficial in addressing underlying weaknesses through the GLOBSEC Danube Tech Valley – Markets Stream.

Project Ideas under the GLOBSEC Danube Tech Valley – Markets Stream

- ▶ **DTVI Impact-Interest Analysis:** A data-based comprehensive analysis should be created to identify 3-5 industrial verticals (e.g., mobility, fin-tech, climate-tech, artificial intelligence, driverless car testing space, cross-border collaboration in agriculture especially against the backdrop of developments in Ukraine, relative increase in the importance of the Danube River as a means of commercial/industrial transport, etc.) where CEE countries are better off cooperating than competing. The identification of these focal points should include follow-through focused on development of an implementation roadmap to promote an innovation value chain throughout the Danube Region.
- ▶ **DTVI Ease of Entry Focal Point:** A single juncture is needed to pool information and expertise and practical assistance to facilitate ease of entry to EU markets (approximately 500 million people) and the ease of entry of DTVI firms to US markets (through, for example, the Silicon Valley affiliates of the DTVI). Priority access should be granted to sales platforms based on DTVI membership.
- ▶ **Betting on Dense, Sustainable, and Functional CEE Physical Infrastructure:** Extending the physical infrastructure of tomorrow across the region will be integral to efficient cross-border activities. The infrastructure component should be conducive to the entire range of green transportation including EV charging infrastructure across the region, the exploration of hydrogen alternatives for buses and trucks, and sustainable rail.



Regulatory Framework

Regulatory Framework in Innovation Literature

The policy and regulatory environment play a powerful role in determining how well innovation processes and actors can operate. Despite innovation's contribution to a country's long-term economic growth and competitiveness, it is by no means a given that governments recognise or incentivise innovation activity within their policy frameworks.

Some environments can actively impede innovation, whether intentionally or not, through stringent rules, risk adverse attitudes, and institutional regulations and practices that actually encourage resistance to change rather than spurring creativity and adaptation.⁴ The challenge rests in finding policy solutions that work as innovation accelerators in a given country's context.

Innovation ecosystem theory presents two broad categories of government approaches to supporting innovation. The first is a top-down approach where the public sector acts as a planner or orchestrator of the innovation process. The public sector is responsible for driving demand for innovation through appropriate policies, regulations, and/or innovation targets that steer the market. The Swedish government, for example, directly creates mechanisms to enable university-industry interactions. And Japan's Ministry of International Trade and Industry provides subsidies for research and promotes the technology commercialization of Japanese firms. The second arrangement is premised on a bottom-up logic that encourages collaboration and partnerships and promotes a culture of innovation. The public sector acts more

as a facilitator, promoting innovation indirectly through, for example, the market and the promotion of the benefits of innovation. The government may further spotlight values that celebrate innovation by encouraging collaboration and building resilience towards failure. The US government, for example, has set up competition-based rules to facilitate linkages and networks among universities, entrepreneurs, accelerators, firms, and venture capitalists. In practice, governments usually adopt a hybrid of both top-down and bottom-up approaches based on their national priorities, capabilities, and general economic needs.⁴

Building an innovation ecosystem and creating a competitive advantage is largely based on a business-friendly environment with complex relationships between actors.³¹ Business environments and regulatory conditions are assessed by a standard set of indicators such as the World Bank's ease of doing business index, The OECD's product market regulation indicator, the World Bank's ease of getting credit indicator, and the European Commission's digital economy and society index.³² The ease of doing business, for example, can be improved in a country through different regulatory instruments – governments should primarily focus on fostering start-up creation and supporting innovation, for example, by reducing minimum capital requirements, simplifying documentation requirements for starting a business, and streamlining insolvency resolution.²⁶ The business environment is also largely shaped by administrative burdens - regulations that create red tape or other obstacles for businesses can often deprive innovators of resources and time they might otherwise devote to



more productive activities. For this reason, governments have recently sought to address this issue through administrative burdens reduction programmes. The Netherlands pioneered a measurement system for administrative burdens, originally labelled MISTRAL, which gave rise to an international brand (the Standard Cost Model – SCM) that has been adopted by a growing number of countries.²⁸ Regulation is considered to be stringent if firms need to significantly change their behaviour or develop new technology in order to comply with the regulation.²⁸ Timing is another important aspect of regulation. Too little time for compliance with regulatory requirements may discourage innovation. Too much time provided to achieve compliance with regulatory requirements, by contrast, could freeze innovation efforts by removing necessary external pressure. The optimal timing is up for discussion and consideration by respective regulators.²⁸

Regulations, furthermore, need to focus on tax instruments and fiscal incentives (these too can be used to stimulate innovation).²⁶ Tax policies on early-stage investment in high-risk innovative businesses can change the incentives for investing in start-ups that have significant technical and market risks. The UK's Seed Entrepreneur Investment Scheme (SEIS), for example, enables capital gains and income taxes to be structured to incentivize angel and late-stage investment in high-growth businesses. Other (less well-known) policies that impact innovation funding include tax policies surrounding philanthropic investments. Policies that enable charitable funds to be transferred to for-profit start-ups in the US (if the respective start-ups focus on supporting charitable causes such as public health or access to clean water), for example, can help generate additional funding for innovative businesses.¹⁸ Governments can use different types of R&D tax incentives to encourage innovation. An R&D tax incentive reduces the tax liability of firms undertaking R&D and innovation activities, thereby lowering the private cost of R&D and encouraging additional investment in innovation activities. An analysis of the incremental R&D tax credit in France from 1993 to 2003 concluded that one euro of tax credit would contribute to slightly more than one euro of total R&D and simultaneously support the development of research jobs. Cross-country studies have also supported the positive effect of R&D tax incentives. Data on tax changes and R&D spending in nine OECD countries from 1979 to 1997 reveals that “a 10 percent fall in the cost of R&D stimulates just over a 1 percent rise in the level of R&D in the short-run, and just under a 10 percent rise in R&D in the long-run.”¹⁸

Digital and physical infrastructure are also necessary to support innovation at all stages. Enabling start-ups to lease space without incurring long-term costs can provide an important incentive to start entrepreneurial ventures. The workplaces could be university-based or private-sector co-working spaces. Effective access to highly specialised technical infrastructure and equipment further enables ideas to become impactful. Widely accessible national or university research facilities enhance the productivity of R&D investments. Broadband internet services are also relevant - they can facilitate the engagement of start-ups from different locations around the world and aid the effective development of innovative businesses when large amounts of data and analysis are present. In Australia, for example, the government is developing policies to ensure that 93% of its population is served by optical fibre. Access to quality digital data, underpinned by digital policies, constitutes another element of infrastructure. Specific data on, for example, energy utilization or transportation can provide a source of insights and opportunities to address key problems and challenges within a country. Regulatory sandbox policies are another emerging approach that governments can deploy to enable start-ups within emerging sectors, like fintech, to test their products without a full regulatory process in place. It is vital that the regulatory system is flexible but also clear enough to enable companies to make decisions and manage risk appropriately. In the UK, for example, the Financial Conduct Authority introduced a UK sandbox for fintech companies in 2016.¹⁸

Relaxing employment protection laws and providing more flexibility in labour markets ostensibly enhances innovation. Advocates of labour market deregulation suggest that, if layoffs are easier to carry out, engagement in risky new ventures is also more palatable. The enhanced inflow of fresh talent and the threat of dismissal could also potentially contribute to the enhanced productivity of employees. There is also literature, however, that argues the opposite to be true. Labour market rigidity including protections from firings, job guarantees for insiders, and centralized bargaining increase mutual trust, commitment, and loyalty which, in turn, support innovation, mobilization, and the accumulation of knowledge. Greater trust and loyalty also reduce supervisory management costs and lessen externalities - committed employees are less likely to leak knowledge to competitors.³³

The optimisation of mobility and migration regulations shapes the outflow and inflow of human capital and influences the international migration of individuals into and out of a region and the retention of people within a region. While immigration is often controversial, visa policies and poli-



cies directed at attracting returnees are necessary to expand the workforce to include residents that are highly trained in innovation and/or entrepreneurship. The pertinence of an open approach is underscored by Silicon Valley's success and the diverse immigrant population that has helped achieve it. The UK's recent entrepreneur visa, likewise, was an integral part of the revival of London's vibrant innovation ecosystem. And policies, such as those in Singapore, that encourage the return of innovators more broadly support the flow of talent into countries. Singapore's EntrePass scheme further attracts international entrepreneurs with a growing emphasis on attracting talent in Deep Tech. The UAE, for its part, has introduced a new ten-year visa for investors and entrepreneurs.¹⁸ Related to human capital policy - non-compete agreements (NCA) provide legally binding elements of employment contracts that place time-based limitations on individuals taking their talent from one organization to another. There is growing evidence that regions, by relaxing NCAs and therefore easing barriers to mobility, enable innovation through the movement of ideas across organizations. In response, several US states have changed their non-compete policies both for workers in low and high paid employment. In Norway, under the Working Environment Act, new non-competition rules have also been put into place to stimulate the innovation economy.¹⁸ To foster cross-border activity, countries should harmonise their regulations to remove uncertainties, inefficiencies, and market barriers that can hinder innovation. A problem that could put up obstacles to harmonisation efforts, however, concerns the wide range of disparate policies that countries must coordinate to create enabling environments for innovation. These policies stretch across ministerial boundaries including a focus on shaping research, technology commercialization, IT investments, education and skills development, taxes, trade, and government procurement.⁴

Current State in the CEE Region and Policy Opportunity

Regulation at the EU level can often be a powerful stimulus to innovation at all stages of the innovation process (also within the CEE region).²⁸

Apart from policies specifically targeted towards innovation, numerous other EU policies affect innovation processes including regulatory reforms, red tape reduction, and internal market policies such as competition law, public procurement legislation, standardization, and sector-specific regulation.³⁴ Lower compliance and lower red tape burdens have been found to engender a positive effect on innovation. If regulation is more prescriptive, it generally tends to set back innovative activities.

More flexible regulation, on the other hand, can stimulate innovation.²⁸

CEE governments should prioritize the development of an optimal ecosystem through which start-ups can thrive. The inability of businesses, investors, and innovators to rely on regulations is recognised as an impediment to innovation activity. But some governments, such as Hungary and Poland, have actively supported the growth of start-ups by setting up special economic zones – these arrangements provide investors tax breaks and other benefits. Some countries have also invested in the infrastructure needed to support technology.¹⁵ In Poland, companies engaging in R&D activities have benefitted from a tax break since 2016 (though the tax break has sparked some uncertainty and confusion on account of ambiguity with respect the particular activities that qualify as R&D under the law).³⁵ And Estonia has developed one of the most cutting edge free Wi-Fi networks in the world, prioritized the teaching of coding to young students, and established an e-residency programme to attract foreign entrepreneurs. Other CEE countries have promoted accelerator programmes, incubators, co-working spaces, and angel investor funds to support innovation - all important elements of innovation ecosystems.³⁰ Labour market regulations and business regulations, however, can create obstacles for firms to innovate and find staff with the necessary skill sets. Harmonised policies are rather needed within the region that facilitate CEE start-ups in disseminating their products/services to other markets. The governments should devise a set of common proposals and recommendations to optimise and harmonise national regulatory frameworks for transnational cluster cooperation. These proposals could include the alignment and integration of different funding schemes and other modifications aimed at fostering more innovative and efficient practices.³⁶ A prospective “new growth model” is emerging as a candidate to be the driving force of the region's economic convergence for the coming years. This model has been based on various recent policy analyses and recommendations. The common elements of the model generally include an emphasis on home-grown innovation, policies to maintain and strengthen the skilled labour force, stronger reliance on domestic savings, and the development of public infrastructure using EU funds. There are several areas where significant gaps exist in CEE infrastructure including transport, energy, and digital infrastructure. EU funds provide a one-off opportunity to lay the foundations for the development of these capacities and necessary innovation ecosystem enabling factors.³⁷

Many of these trends are related to the continent's business and policy landscape. European



countries share a relatively rigid and inflexible business environment hampering creative destruction. This pertains to both firms and labour markets. European labour markets are, on average, more than twenty times less flexible than the US labour market based on the composite OECD's 2019 *strictness of employment protection – individual and collective dismissals (regular contracts)* indicator³⁸. Recent data on firm bankruptcies are a case in point: While bankruptcy rates in the US remained broadly unchanged in annual terms in 2020, a decline in bankruptcies has been observed across most EU Member States owing to government measures during the Covid-19 crisis.³⁹

At the same time, other regulation is highly variant among EU countries including, but not limited to, financial markets regulation. This variance creates barriers to entry and towards achieving scale.² ⁴⁰ While American, Chinese, and Japanese companies, consequently, can rapidly reach millions of domestic customers, European countries must contend with a kaleidoscope of national identities, languages, laws, and taxes, limiting the growth of both frontier start-ups and international champions alike. Although over 36% of formally funded start-ups have been founded in Europe, only 14% of unicorns come from the continent.⁴¹ The EU also boasts a disproportionately low number of large companies, a significant challenge given that large companies are responsible for most global R&D spending.² Indeed, approximately two-thirds of worldwide private R&D spending comes from only 250 companies (the majority of these are headquartered in the US, Japan, and China).^{2, 42}

Based on this prevailing status quo, the following tangible projects may prove beneficial in addressing underlying weaknesses through the GLOBSEC Danube Tech Valley – Regulatory Framework Stream.

Project Ideas under the GLOBSEC Danube Tech Valley – Regulatory Framework Stream

- ▶ **Danube “Ease of Starting a Business” Insight Report, Cross-Border Working Group, and Policy Recommendation:** The study will map current bottlenecks to launching a business, ranging from red tape to cost to length. Policy outcomes will be presented before a roundtable of the Ministry of Economy/Finance officials – the platform will explore the potential for sharing best practices, streamlining registration procedures, the digitalisation of the application process, and the exchange of information via shared databases.

- ▶ **Fiscal Incentives and Tax Instruments Study with Policy Recommendation:** The study will map current tax regimens of CEE countries and identify potential avenues – economically sound and politically palatable – forward in this arena. R&D activities in many countries can access tax deductions (e.g., at 40%) and more (50%) if there is a collaboration with universities, technological centres, and qualified R&D personnel (for innovation activities, a general 15% deduction applies).
- ▶ **SWOT Matrix for Regulation of Innovative Labour Market Outcomes and Brain Circulation Ecosystem in CEE:** The talent challenge from a regulatory standpoint is multifaceted and politically sensitive. It includes optimising migration frameworks to better welcome talent from third countries outside the European Union (i.e., removing barriers for entry and specifically targeting researchers and other highly educated migrants). It also entails labour market regulation and relaxing employment protection laws since they constrain labour mobility and talent circulation. High labour costs generally increase the opportunity costs for entrepreneurial talent to move from a tenured position to a less secure position as a founder or employee of an innovative (potentially high growth) start-up. Employment protection, especially firing costs and costs for sick leave, also constrains labour mobility on the demand side by placing a large burden of responsibility on a relatively small (start-up) organization. The relative costs of paying an unproductive employee are considerably higher for a small organization than for a large organization.
- ▶ **Product Markets Deregulation Study with Policy Recommendation:** To remove regulatory barriers for entry for new innovative start-ups and improve coordination in the region, the product markets regulation should be analysed and opportunities for loosening of the regulation across the region should be identified.
- ▶ **Brief “Incentivizing Entrepreneurship” through targeted policy:** The initiative will analyse best practices elsewhere that create direct incentives for entrepreneurship. The Swedish example where employees can take 6 months off from their regular employment to start their own business is a case in point. The policy should be tailored to CEE. These do not need to be cross-border harmonised incentives, but a common analysis of the region may be helpful in pinpointing the right policy approaches.

Support Systems and Culture

Support Systems and Culture in Innovation Literature

Culture is viewed as the underlying foundation for innovation processes and it is important to nurture an innovation-conducive culture. In some cultures, negative associations can be attributed to innovation and entrepreneurship, for instance, having a career in innovation being a less viable option to more traditional professions. It may require a mindset shift of the population requiring contributions from a wide range of actors over an extended period of time.⁴

There are several challenges towards achieving a supportive culture. A primary concern pertains to overcoming narrowly defined conceptions about innovation in the popular imagination of societies - the word “innovation” is rather often used synonymously with “technology”. Innovation should be presented more as a mindset to

become embedded in a culture.⁴ Innovation in ecosystems, secondly, is often siloed geographically or by sectors. In a robust innovation ecosystem, cross-sectoral and cross-societal connections among different actors are present and transcend the boundaries of metropolitan hubs.⁴ Plans for the development of an innovation-supporting-culture, thirdly, are difficult when the cycles for government regulators and policymakers span three or four years with preferences for “quick win outcomes” - developing an ecosystem can extend beyond their timeframe. There is a need to invest in the long-term by lending support to the construction of innovation ecosystems. Weak cultures of collaboration among researchers, innovators, and research institutions themselves, finally, pose a challenge for fostering supportive cultures for innovation.⁴



Ecosystems thrive on connections, underscoring the importance to creating or investing in initiatives that facilitate cross-sectoral and cross-societal connections to nurture a supportive culture.⁴

Facilitating collaborative relationships between academia, the private sector, and government (so-called triple helix model relationships) can improve the flow of ideas and innovation resources across ecosystems.⁴ Collaboration between these three actors that command agenda setting power, leader status, and control over resources can act as powerful impetus for the cultivation of supportive cultures.⁴ At its core, innovation is about effective learning; fostering an innovative culture, in turn, is necessarily intertwined with creating a learning culture. It is important, consequently, to provide support to innovators and intermediaries in cultivating mindsets built around curiosity and creativity.⁴ Learning opportunities, moreover, need to be available to everyone and should be as inclusive as possible to put a stop to the idea that innovation is 'not for everyone'.⁴ Enterprise bankruptcy policies and laws can enact strongly negative effects on the number of emerging innovation businesses. If bankruptcy limits the ability of individuals to start another business, for example, by constraining access to personal funding, it can shape the decision making of entrepreneurs and the culture around entrepreneurship. Strict bankruptcy policies can strengthen the "fear of failure" culture and its chilling effects on innovative intentions.¹⁸

Governments constitute the principal actors in achieving supporting systems and cultures. They can create a culture supportive of innovation at different levels of society through policy initiatives, the relative profiling of innovation, and contributions to sharing and celebrating innovation stories (including those that may have failed but from which valuable learning took place). Public sector prizes can also drive innovation. In the US, policy innovations (such as the US Science Prize Competition Act) now enable government agencies to use prize-based mechanisms to steer innovation towards specific national objectives and missions.¹⁸ Instruments at the disposal of policy makers include the creation of innovation clusters and economic zones. Singapore, for example, has created nine free-trade zones, each with clear objectives in terms of focus sectors, policies tailored towards attracting investors (such as tax advantages), and key locations allocated to target companies.²⁶ Other influential actors include academic institutions and the innovators themselves. Innovators may promote a culture of innovation to the extent to which they are able to dismantle myths about innovation among the general population.⁴

Current State in the CEE Region and Policy Opportunity

A relatively low innovation culture persists in the CEE countries that were once part of the communist bloc and lacked an extensive market economy experience.⁴³ Research suggests that important elements of regional innovation systems are absent from CEE countries including the existence of capable organizations in both the knowledge generation and knowledge exploitation subsystems, networks and knowledge linkages between regional innovation actors, inherent openness to risk (rather than aversion), and institutions that support innovation.⁴³

Culture is one of the primary factors that influence social innovation (particularly in CEE). Among factors fostering social innovation include existing financial programmes and instruments, positive reforms in the regulatory environment for social enterprises, and strong individual leadership of innovators who often initiate social innovation. That said, CEE countries, if they wish to foster social innovation, still require awareness raising efforts concerning successful social innovation initiatives and the mobilization of more volunteers. The lack of a volunteering culture, in turn, further hampers the development of social innovations in CEE. Combined with the lack of funding at the national level, a lack of social and policy support for social innovation initiatives, and an underdeveloped entrepreneurial culture, an unfavourable environment for the development and scaling of social innovations is created.⁴⁴

Developing support systems for continuous entrepreneurial discovery and functional national or regional innovation ecosystems requires more flexible approaches to bureaucratic rules and regulations and changes in routines and governance practices at the CEE level. Weak institutional capacity is currently perceived as the key inhibitor in many lagging regions - specific policies must be developed to promote institutional reforms and alleviate institutional bottlenecks, strengthen strategic management capabilities, and foster the emergence of "innovation platforms". Creating a culture of openness, mutual trust, and cooperation are integral to ensuring the entire innovation ecosystem works in practice.⁴⁵

To attract human capital to cities in the region, it is necessary to provide amenities and infrastructure. Green spaces, theatres, museums, cinemas, coffee shops and art galleries, together with transportation infrastructure, can foster interactions between agents of the innovation ecosystem. These attributes can also contribute to attracting high-quality skilled labour, enhance connectivity between



them, support labour mobility, and bolster the exchange of knowledge and information. Through well-developed infrastructure, so-called third spaces are created in the ecosystem that convene pro-active people, regional authorities, researchers, education institutes, public leaders, societal organizations, and/or NGOs. Networks, therefore, can be more easily established and better communication flow between agents of the ecosystem stimulated. Amenities and infrastructure indeed go hand in hand with increased demand for business incubators and accelerators.⁴⁶ The development of an environment that fosters creativity will, overall, ensure that innovation will follow.

Based on this prevailing status quo, the following tangible projects may prove beneficial in addressing underlying weaknesses through the GLOBSEC Danube Tech Valley – Support Systems and Culture Stream.

Project Ideas under the GLOBSEC Danube Tech Valley – Support Systems and Culture Stream

- ▶ **The GLOBSEC Danube Tech Summit** (plenary and expo format): A new annual format for CEE innovation (a variation on the Lisbon-based Tech Summit) should be established to enhance knowledge circulation and network-effects between public research and education institutes and societal organizations and businesses, lower interaction barriers, match ideas with capital, and provide a visible place for these types of interactions (mentors, incubators, and accelerators)
- ▶ **The GLOBSEC High-level Danube Tech Award:** A new annual recognition ceremony should be founded and directed at recognising distinguished contributions to the CEE innovation ecosystem to foster entrepreneurship and innovation visibility and nurture an innovation culture in the region.
- ▶ **The GLOBSEC Danube TECH-Talks:** A series of CEE start-up and entrepreneurial successes and failures narrated by start-up founders, investors, and other innovation actors in a TED-style presentation format will provide role models, foster a positive image of entrepreneurship, enhance network effects, promote knowledge sharing, inspire future young leaders, and up entrepreneurial appetite and risk-taking in the region.
- ▶ **The GLOBSEC Danube R&D + Excellence Campus:** Sustainable innovation-driven growth needs to build on research capacities, funding, institutions, human resources, and the capacity to transform R&D results into marketable products. Collaboration needs to be incentivized through a common funding vehicle for cross-border R&D cooperation building on the structure of EU research programmes. This should be complemented by the upgrading of technical skills in the region by creating a network of ongoing education establishments for technical skills. Finally, a campus for a (of a) world class technical university would bring high quality knowhow into the region and act as a centre of gravity for investment and additional research facilities.
- ▶ **Innovative Small Business Consortium and Public Demand:** The public sector should procure innovative products and sub-contract innovative start-ups to support new idea entrepreneurship through public demand. Social innovations, in particular, should be procured to tackle domains that are in the public interest.
- ▶ **The GLOBSEC Danube Tech Valley Ecosystem Monitoring Platform:** To assess the current state of the ecosystem, enhance our understanding of obstacles within the ecosystem that hinder its level of maturity and its outcomes, and track progress, a monitoring platform needs to be established to tackle bottlenecks. The platform will be comprehensive and consist of the following components:
 - a. A steady set of quantifiable indicators to assess the current CEE innovation ecosystem and re-measure it once steps have been taken to evaluate the level of change;
 - b. A regular survey will be sent to a steady database of innovation actors to gather the community's input on progress and improvements (i.e., what is working and what is not);
 - c. Comprehensive mapping of CEE TOP 100 Tech Companies, CEE TOP 100 Start-ups, and CEE Top Research Institutes and Educational Facilities converted into visually pleasing ranking publications to better understand and sell the region.

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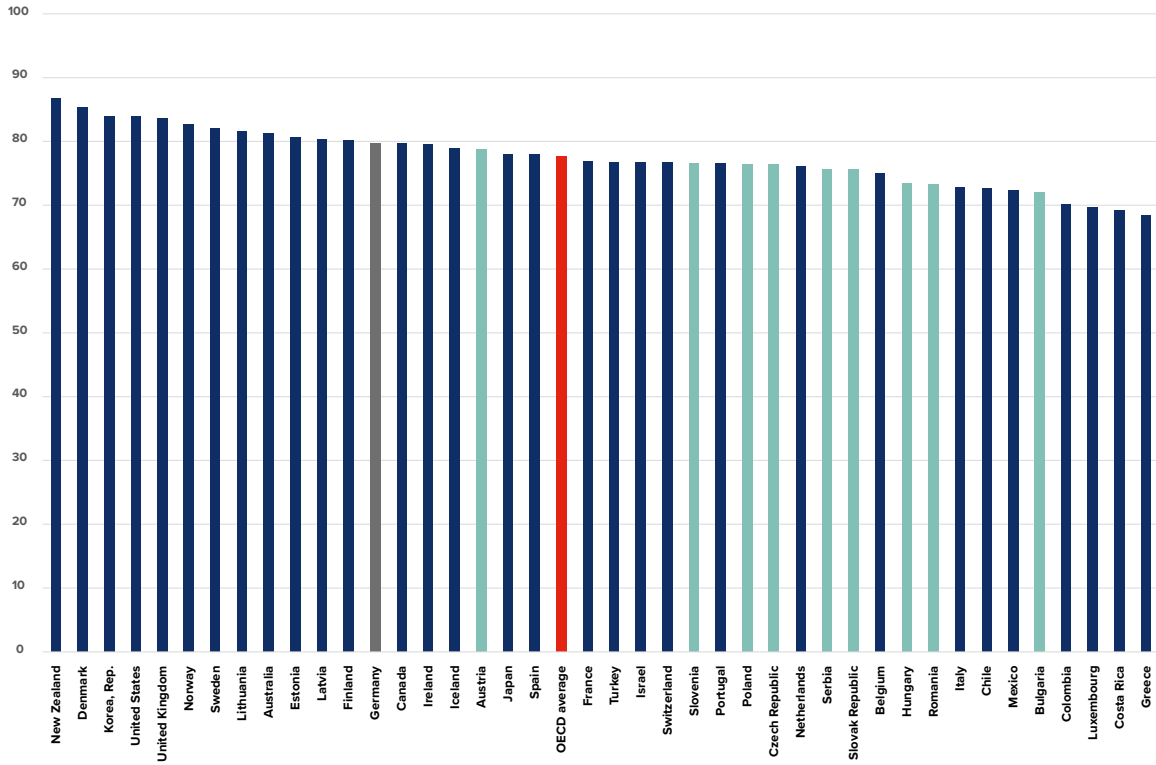
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Statistical Annex

Figure 1. Ease of doing business (2019)

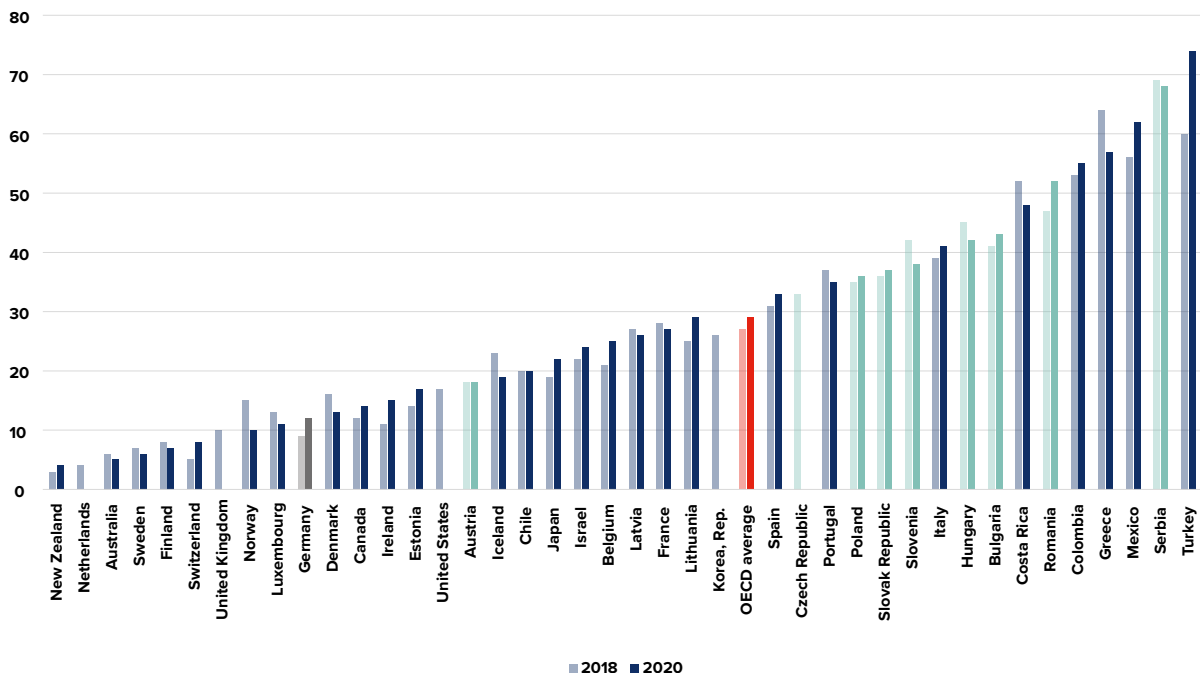
0 = lowest performance to 100 = best performance



Source: World Bank

Figure 2. Regulatory Quality (2018 and 2020)

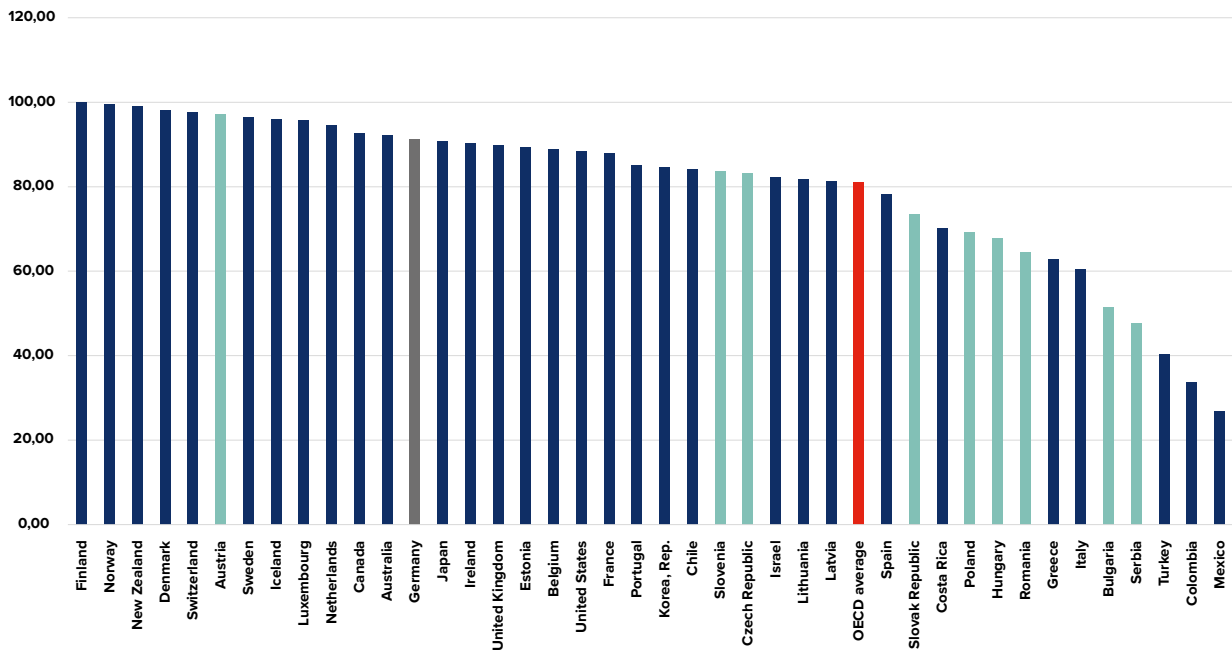
Rank out of 131 countries



Source: World Bank

Figure 3. Rule of Law (2020)

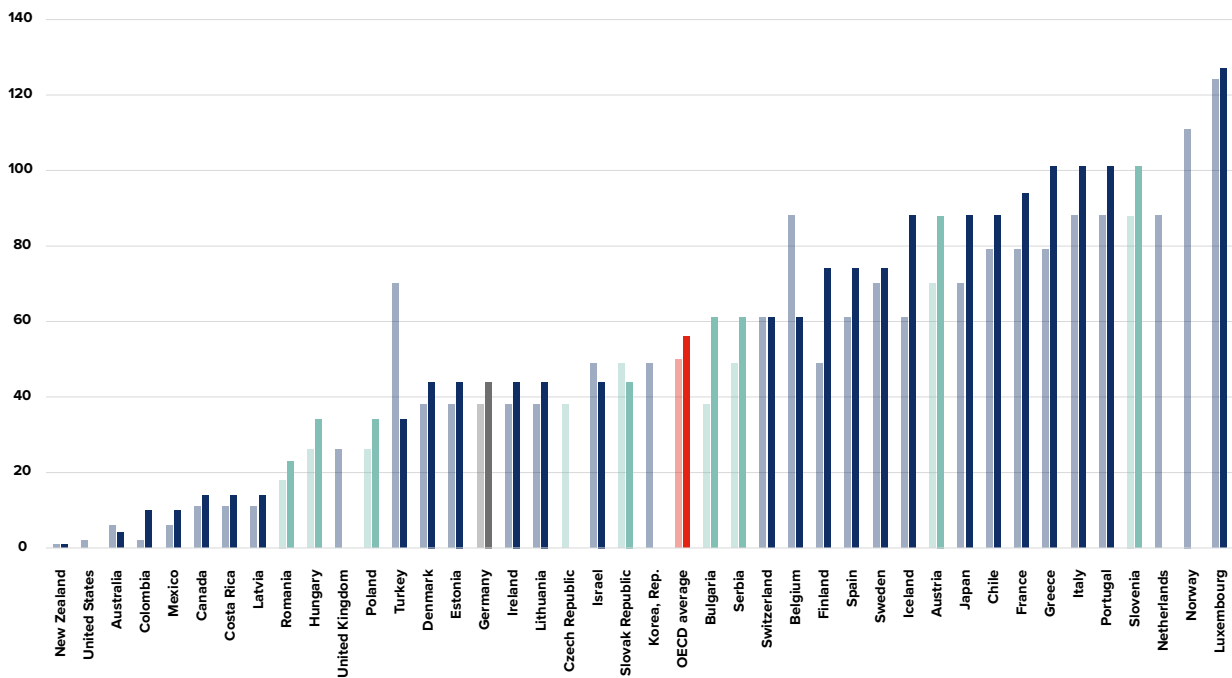
Percentile rank among all countries (ranges from 0 = lowest to 100 = highest rank)



Source: World Bank

Figure 4. Ease of getting credit (2018 and 2020)

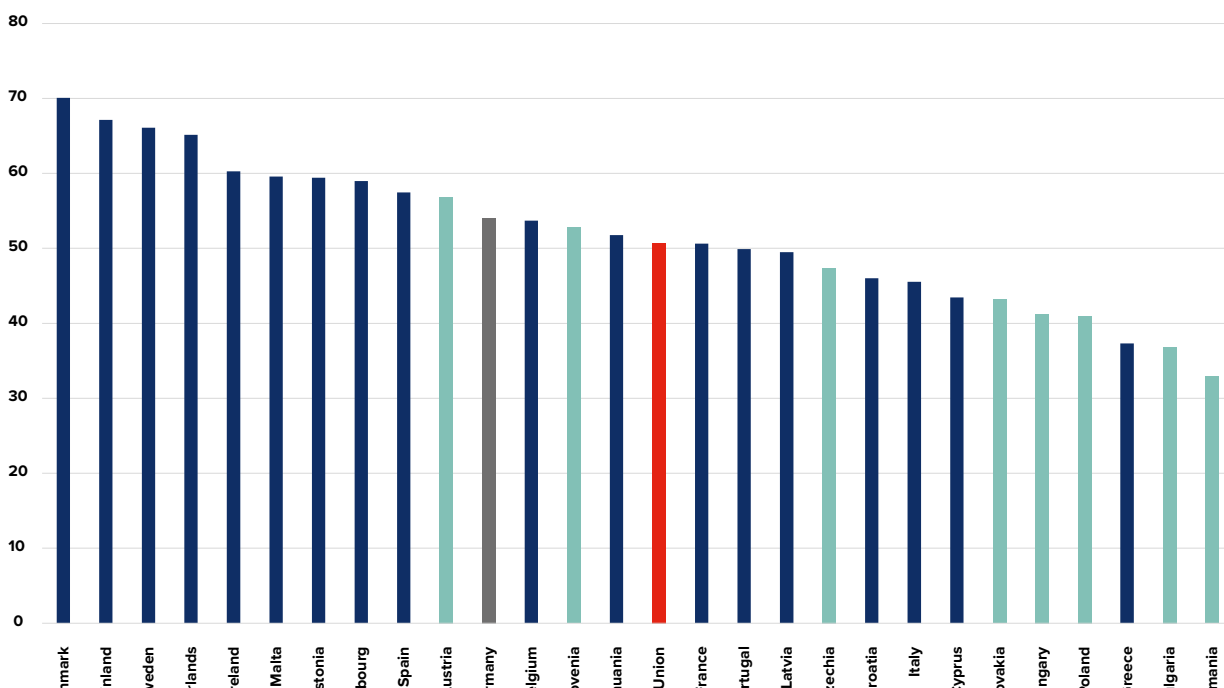
Rank out of 131 countries



Source: World Bank

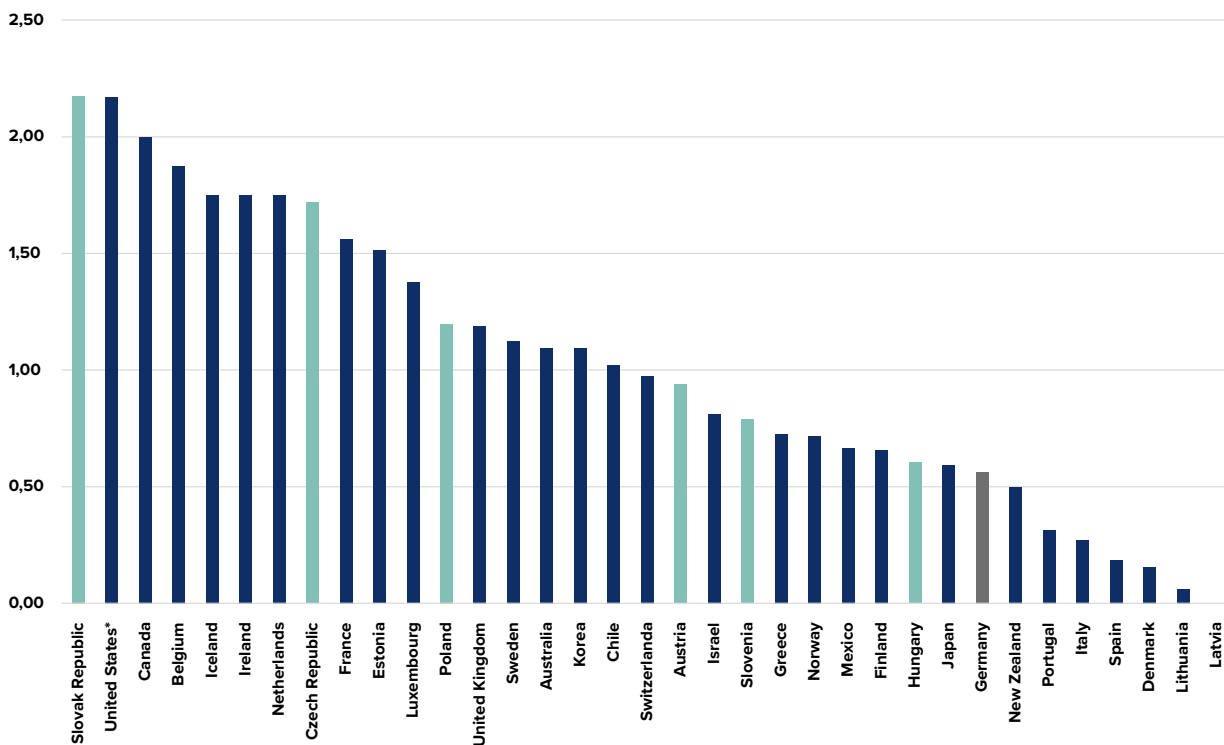
Figure 5. Digital Economy and Society Index (2021)

Weighted score 0 to 100



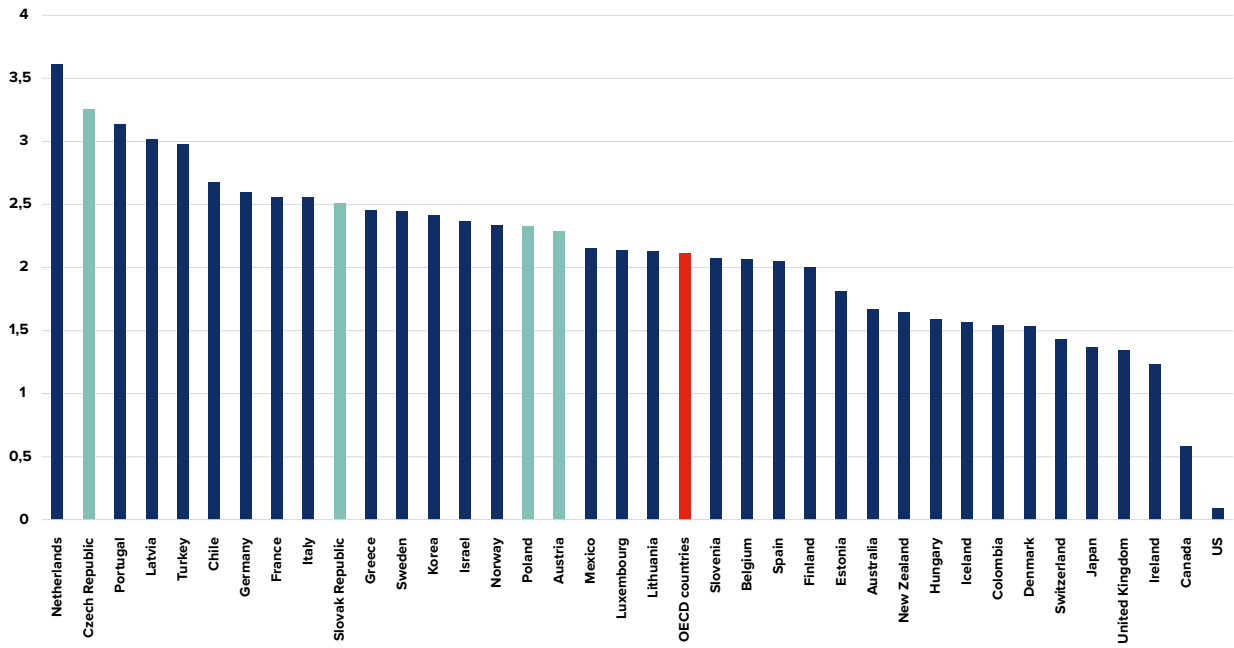
Source: European Commission

Figure 6. Administrative burden on start-ups (2018)



Source: OECD – Product Market Regulation Database

Figure 7. Strictness of employment protection – individual and collective dismissals (regulator contracts) (2019)



Source: OECD



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