

# Start-Up Ecosystem: Proposals for Fuelling the Hungarian Start-Up Scene

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*The essay examines the role of the start-up ecosystem in the economy. It offers an international outlook to analyse the features of the Hungarian system, points out areas for development and reviews international best practices. The examination shows that overarching cooperation among economic actors could engender a start-up scene where not only 30,000 new high value-added jobs would be created, but also around EUR 1.3 billion in direct funding would appear in the economy.*

**Journal of Economic Literature (JEL) codes:** C10, G23, G24, J20, M13, O30, O40

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## 1. Introduction

The world economy is contending with several challenges: rising inflation, an unclear recovery from the pandemic, war in Ukraine and a cost-intensive energy transition in Europe. In this light, most experts and analysts agree that a marked and persistent deterioration of macroeconomic conditions is on the horizon.

Start-ups also face these challenges, but of course diamonds are formed under pressure. Many of the world's greatest start-up successes were born and built during economic downturns: one need only mention Airbnb, Uber, Slack or Square. Challenging times force entrepreneurs to take risks and establish, test and fully develop innovative business models. Average firms tend to be cautious during economic downturns, while more ambitious risk-takers, especially start-ups, recognise the opportunities, and their successes benefit the economy as a whole

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\* The papers in this issue contain the views of the authors which are not necessarily the same as the official views of the Magyar Nemzeti Bank.

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through innovations, product development and job creation. At a time when governments seek to soften the impact of a slowdown with all means possible, catalysing a start-up ecosystem is a highly promising option.

In the Central and Eastern European (CEE) region, start-ups can face dilemmas in acquiring the necessary resources. Several studies analyse the peculiar features of CEE start-ups. The institutional environment of the individual countries has a major impact on the propensity to start a business and the migration of existing start-ups. The CEE region is experiencing an outward migration of start-up founders (*Szennay 2019*). While in recent years some start-ups financed with venture capital in the Central and Eastern European countries became very successful unicorns, the size of venture capital funds lags far behind the European average, and the state plays an extremely large role in financing (*Karsai 2022*). *Békés and Muraközy (2012)* examined the features of high-growth gazelle firms and found that the businesses in a better financial position which employ young, skilled workers are 10 per cent more likely to become gazelles. The results also show that overall an economic policy that facilitates economic growth and supports new companies can be effectively developed. Supplementing this, *De Nicola et al. (2021)* looked at how gazelles affect the Hungarian economy and concluded that they are positively correlated with the productivity growth of the businesses around them. This holds true for those that operate in the same industry as the gazelles, and even for those that are suppliers in an industry with many gazelles. This may be due to two factors: 1) other firms can learn from the leaders and workers at gazelles about effective management and marketing; 2) the presence of gazelles increases the demand for suppliers' goods, which can be manufactured at a larger scale, potentially more efficiently.

Since start-ups mostly rely on workers skilled in software development, research and development and product management, increasing the number of start-ups could serve as a solid basis for retaining such experts and even attracting the professionals currently working abroad to return home. The start-up ecosystem is crucial in fostering the next generation of top (digital) talent and increasing the talent pool, thus ultimately benefitting not only start-ups but also other corporations in realising their innovation and development goals.

## **2. The research – Data and assumptions**

The research presented in the essay relied on various economic and financial databases and public sources. Company data are based on the Dealroom database, adjusted as necessary based on input from local experts.

Dealroom's Hungarian start-up database contains firms that were established in Hungary but are currently headquartered outside Hungary. Dealroom classifies companies as start-ups based on two conditions. First, the product or the business model (or both) needs to be innovative. In most cases, such companies are tech enabled: proprietary technology and software or business processes are heavily enabled by tech, so these companies can achieve high growth by leveraging their platforms. The second condition is rapid scaling or scalability. This means that the start-up should develop a solution to an existing local or even global economic problem that can be easily transposed to other markets, thereby ensuring quick growth for the firm. Due to inconsistencies in the database, the data was reviewed at the different start-up stages and adjusted as necessary if they were inconsistent with the expert view (for example, a start-up considered Series B in the database might have been adjusted, with expert input, to Series A<sup>1</sup>). The average net salary, around EUR 1,450 per month (adjusted across maturity stages) was based on an expert report from Startup Hungary.

The following main assumptions were made during the analysis:

- The impact (both in funding and employment) of certain start-ups was excluded in the cases listed below to ensure a conservative approach. 1) Pre-seed: excluded as a result of incomplete data on Hungary (for instance, funding data were available for only 4 per cent of pre-seed start-ups). 2) Exit: excluded as a result of the limited availability of data on funding in Hungary. 3) IPO: excluded because IPOs would disproportionately increase the funding and employment impact and because the main beneficiaries of a more active ecosystem are start-ups in earlier maturity stages (in other words, the additional impact for start-ups with a potential for IPOs was lower).
- The impact of the assumed measures was estimated for the period between 2025 and 2030.

For some start-ups, funding and employment data are limited for certain stages of maturity (the authors only had access to the funding data of 20 per cent of all start-ups and employment data of 32 per cent of them, albeit this includes the very large number of pre-seed start-ups for which data was available for only 4 per cent of them, so as previously mentioned they were excluded from the impact analysis).

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<sup>1</sup> The terms Series A, B and C refer to the rounds of financing from venture capital investors, structured by start-up life cycle and the amount of funding. However, the international literature does not have a consensus definition about classifying a given capital raising into one of the rounds. Dealroom uses the following classification for European start-ups based on the amount of capital raised: (1) Pre-seed: under EUR 1 million; (2) Seed: EUR 1–4 million; (3) Series A: EUR 4–15 million; (4) Series B: EUR 15–40 million; (5) Series C: EUR 40–100 million.

### 3. The state of Hungary's start-up ecosystem

Hungary now has around 3,000 start-ups, according to data from Dealroom, a global provider of information on start-ups and venture capital (VC) activity.<sup>2</sup> Collectively, these start-ups employ some 10,000 to 15,000 people and have raised over EUR 1,400 million in funding.<sup>3</sup> Certain strengths of the Hungarian economy, such as a culture of scientific innovation, skilled talent and the proximity to large European markets could help create a thriving start-up scene. Combining the existing strengths with the best practices of other countries would allow Hungary to considerably increase the competitiveness of its economy.

However, an international outlook reveals that Hungary may lag behind the CEE region currently. Hungary was only placed 50th in the Global Startup Ecosystem Index by StartupBlink,<sup>4</sup> behind most countries from the CEE region (Estonia 14th, Poland 33rd, the Czech Republic 35th and Romania 42nd). The report also mentions that Hungary increasingly lags behind Europe (while it was placed 25th within Europe in 2020, it is 31st in 2023). This is mainly due to the lack of internationally successful start-ups, attributed by the authors of the report to economic challenges and the migration of talent.

To determine the development opportunities for the Hungarian start-up ecosystem, key metrics were compared across Hungary and the most successful start-up ecosystems from the CEE region and the world (including value creation, financing and the number of start-ups per capita). The results showed room for improvement in almost all dimensions (*Table 1*).

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<sup>2</sup> The data in the table is as of 2021, Dealroom mentions “more than 1,500” Hungarian start-ups in a report published in 2022, suggesting that the figure may have been reviewed since

<sup>3</sup> Does not include the headcount data and the capital raised by pre-seed and exited firms and those that have had an IPO.

<sup>4</sup> *Startup Ecosystem Report 2023*: <https://lp.startupblink.com/report/>

**Table 1**  
**Start-up metrics in Hungary and selected countries**

	Central Eastern Europe							Leading ecosystems in EMEA			
	Bulgaria	Czechia	Hungary	Poland	Romania	Slovakia	Estonia	Germany	Israel	Netherlands	
<b>Financing</b>											
Venture capital funding per capita, EUR	60	80	<b>45</b>	48	116	29	1,967	440	n/a	614	
<b>R&amp;D</b>											
Investment in R&D as a share of GDP, %	0.9	2.0	<b>1.6</b>	1.4	0.5	0.9	1.8	3.1	4.9	2.3	
<b>Talent</b>											
Universities in top 500 for STEM	0	5	<b>2</b>	6	3	0	1	32	5	10	
Universities in top 500 for business	0	0	<b>1</b>	4	1	0	0	13	3	11	
<b>Start-up activity</b>											
Number of start-ups*	1,949	3,315	<b>2,977</b>	7,949	3,413	1,292	2,765	51,296	11,277	45,088	
Start-ups per 1 million population	281	310	<b>305</b>	209	177	237	2,077	616	1,224	2,585	
Average valuation per start-up, EUR million**	1.6	6.9	<b>2.0</b>	5.4	7.5	0.8	11.9	8.2	37.8	6.3	
Number of unicorns	0	4	<b>1</b>	11	1	0	7	58	91	21	

Note: Data for 2021. \* As of February 2022. \*\* Conversion rate: USD 1 = EUR 0.85

Source: Dealroom; OECD; QS Quacquarelli Symonds World University Rankings 2021; McKinsey analysis

Hungary is on a par with the region as a whole in many factors that form the basis for a successful start-up ecosystem. It produces a number of start-ups comparable to that of the other CEE countries, is similar to Poland in venture funding (an estimated EUR 45–50 per capita) and has a largely matching talent pool. In some areas, Hungary is ahead of its peers; for example, it has the region’s highest share of ICT (information and communication technology) experts, 3.6 per cent of the total workforce, compared with an average of 2.8 per cent in the CEE as a whole (Havas et al. 2018).

Human capital is key in the success of Hungarian start-ups focusing on developing and implementing the latest technologies, such as artificial intelligence and biotechnology. In Hungary, the digital infrastructure basically ensures the growth of the tech ecosystem, and funding, which is vital for start-ups, and the interest of venture capital investors are growing (Goreczky 2021). The largest Hungarian companies were able to raise around EUR 400 million in 2021, in various financing rounds. Most of the funds came from foreign private investors, who typically focus on more mature start-ups. A review of the life cycle of top Hungarian start-ups (based on Dealroom funding data) shows that initial funding usually came from Hungarian sources, while a larger round, typically a Series A, involved European investors, and the firms only attracted the interest of American venture capital investors in Series B rounds with tens of millions of euros in funding.

	<b>Company name</b>	<b>Total capital raised, EUR million</b>	<b>Main activity</b>
1	Bitrise	101	Software development
2	SEON	92	Online fraud prevention
3	Aimotive	68	Automated driving
4	Turbine	26	AI-powered oncology drug R&D
5	LMDoki	26	Mobile application for booking appointments
6	Sharp3D	19	3D modelling
7	Craft	18	Document management system
8	CodeCool	13	Programming training
9	Commsignia	10	Vehicle communication
10	Antavo	10	Loyalty programme management

*Note: April 2022 data*  
*Source: Forbes*

However, a start-up ecosystem's health is generally measured by high-valuation exits (the acquisition or IPO of a start-up), both in number and in value. The analysis pointed out that Hungary lags behind its neighbours in the number of so-called unicorns:<sup>5</sup> there have been 4 and 11 unicorns in the Czech Republic and Poland, respectively, and LogMeIn was the only one from Hungary to reach that level.<sup>6</sup> This also means that up-and-coming Hungarian entrepreneurs have few truly good role models, on both the investing and the start-up side, unlike their counterparts in more successful start-up nations. In particular, Estonia and, most recently, Romania have been able to build on their internationally successful unicorns: the trailblazing examples include Skype from Estonia (sold for USD 8.5 billion in 2011) and UiPath from Romania (with an IPO valuation of USD 31 billion in 2021). According to *Startup Genome's Global Startup Ecosystem Report 2023*,<sup>7</sup> the total value of the Hungarian start-up ecosystem is only EUR 1.7 billion (measured between the second half of 2020 and 2022, signalling an approximately 1 per cent decrease from the previous 2-year period), and there was no recent unicorn exit.

*Szennay (2019)* pointed out another important characteristic of the CEE region. The author examined the migration of existing start-ups, and found varying results across the Visegrád countries: Poland and the Czech Republic have positive net start-up migration, while Hungary and Slovakia are experiencing substantial outward migration. Since institutional transformation usually takes a long time, the solution in the short and medium term could be the incubation of start-up ideas and appropriate training and mentoring. Another study summarising expert interviews about the factors influencing the survival and growth of Hungarian start-ups also concluded that internationalisation and acquisitions are crucial in the success of start-ups (*Csákné Filep et al. 2020*).

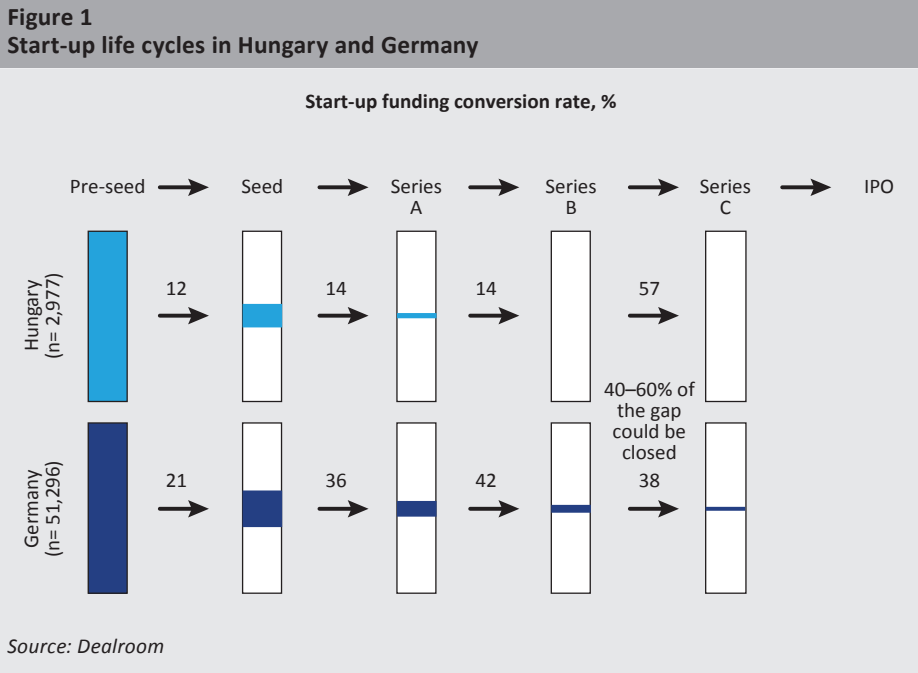
Looking at conversion rates across the “start-up maturity funnel” can help further illuminate opportunities to advance the start-up ecosystem (*Figure 1*).

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<sup>5</sup> Start-ups reaching USD 1 billion in valuation.

<sup>6</sup> LogMeIn was first valued over USD 1 billion after its IPO in the US in 2009, so experts are divided whether it is a unicorn or even a Hungarian start-up.

<sup>7</sup> <https://startupgenome.com/report/gser2023>



When comparing the statistics of Hungary’s maturity funnel with that of Germany, which has one of the top three European start-up ecosystems (EC 2022), it can be seen that Hungary has less than half as many start-ups (proportionally to population) at the beginning of the funnel: 305 start-ups per million people in Hungary, versus 616 in Germany. There are significant gaps in conversion rates, which show when firms advance from one stage of maturity to the next one, at almost all further stages of maturity.

Overall, these ratios indicate that Hungary has room for improvement: it should be focusing on factors that increase the number of start-ups founded and improve the start-up scaling success rate.

#### 4. What does this mean for the economy?

Our analysis indicates that over the coming decade, a more advanced start-up ecosystem could help buoy Hungary’s economy in three ways.

##### 4.1. Economic and financial value added

Increased maturity along the start-up funding funnel (for instance, an increase in the share of start-ups converting from the pre-seed to the seed stage) could generate EUR 2.5 billion–EUR 5.0 billion in additional funding for the sector. Much of that, around EUR 0.6 billion–EUR 1.3 billion would be used as additional direct local



spending in the economy. The resulting job creation could generate up to some EUR 2.2 billion in employment taxes between 2025 and 2030.<sup>8</sup> Other tax revenues are also projected to rise.

In a recent study, *Bisztray et al. (2023)* looked at how quickly growing firms affect productivity growth. The productivity of companies that rapidly increase their revenue typically expands as well, and usually (in 70 per cent of the cases) they make a positive contribution to productivity growth in the industry. The authors also showed that rapid growth is often an extraordinary period in the life of a business: there is positive correlation between productivity growth in a sector and the ratio of young firms, but there is no strong link between the amount of contribution such companies make and industry-specific features.

#### **4.2. Talent development**

A more advanced start-up ecosystem would generate almost 30,000 high value added new jobs in Hungary. Such a well-functioning entrepreneurial community offers appropriate opportunities for Hungarian professionals and may also help attract skilled labour to Hungary from abroad. For digital start-ups, this positive effect could be even greater, not only for the businesses in question but also for the economy as a whole.

#### **4.3. Digitalisation**

McKinsey's report *Digital challengers on the next frontier in Central and Eastern Europe (2022)* includes a deep dive on digitalisation in Hungary. An important finding of the analysis is that a more advanced start-up ecosystem that mainly seeks to commercialise and advance new digital solutions can promote digitalisation at a nationwide level, and the potential economic and development benefits could amount to as much as EUR 9 billion in additional GDP by 2025.

Ambitious firms are especially important for the competitiveness of a country, and a digital entrepreneurial ecosystem can provide significant assistance in the creation of a digital unicorn (*Torres – Godinho 2021*). Besides boosting innovation and entrepreneurship across the economy, digitalisation could reinvigorate traditional industries, allowing them to leapfrog to state-of-the-art technologies by collaborating with local start-ups that can design products and services for those industries' specific needs. Many great examples already exist. For example *Turbine*, based in Hungary, is using AI to develop new digital platforms that streamline the oncology R&D process globally. *Starschema* provides data-warehousing, business intelligence and big data services to many Fortune 500 companies.

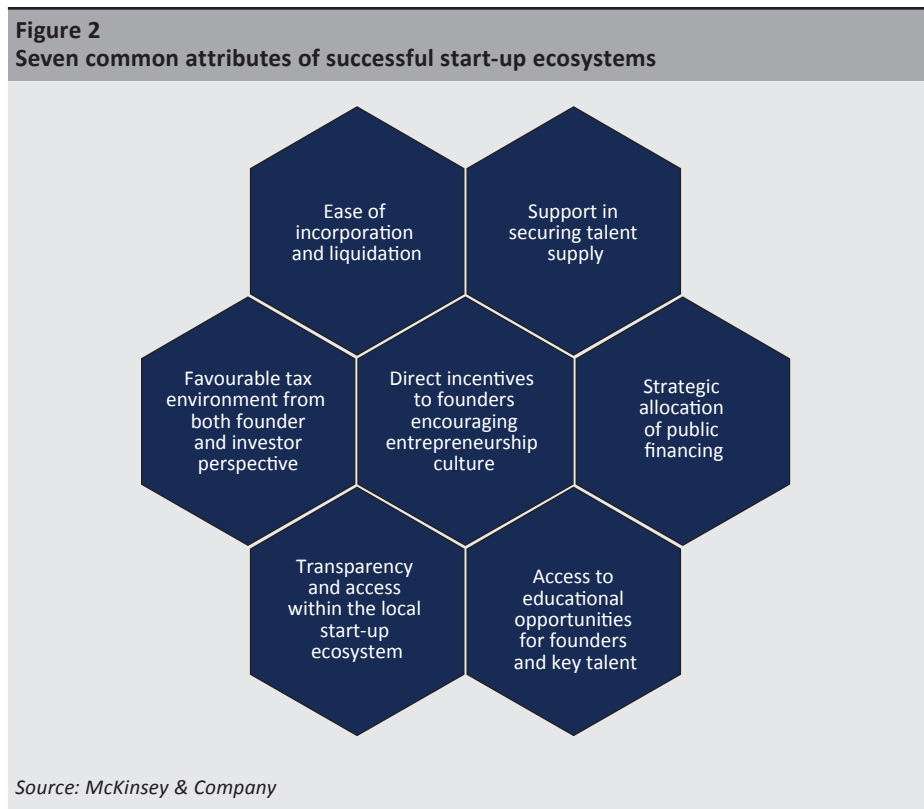
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<sup>8</sup> All figures are nominal as of 2021 and thus do not account for inflation. The nominal values for future years could be higher than indicated.

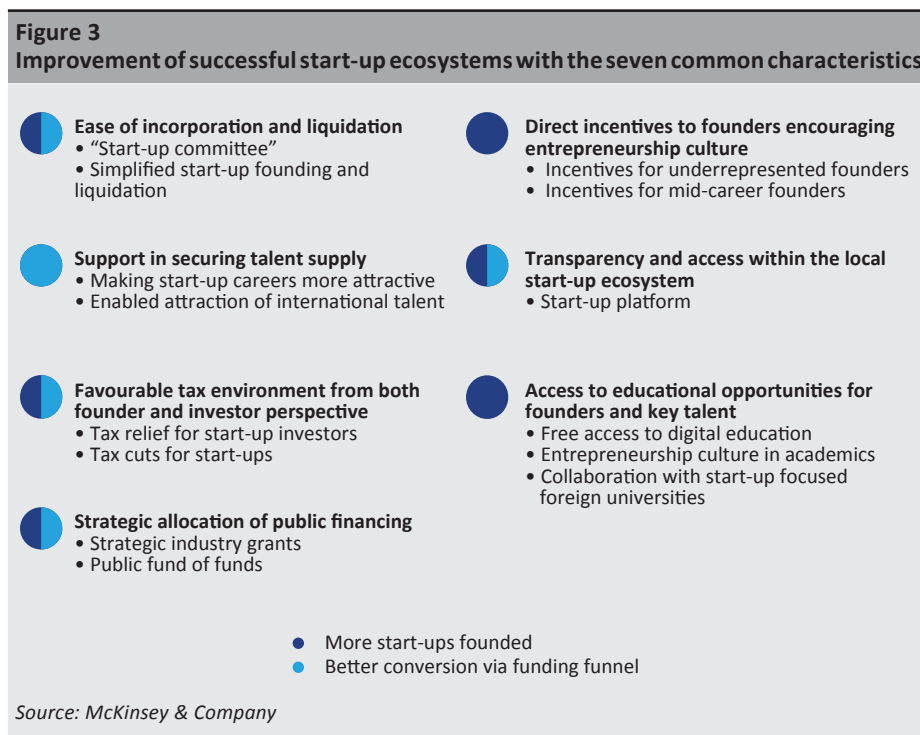
A successful start-up ecosystem is also a sustainable one. It has a positive scale effect when successful founders create, reinvest in and spread their knowledge to new start-ups. Early signs of this effect can already be observed in Hungary, where data from a recent survey by *Startup Hungary (2021)* suggested that about one in four founders have had previous start-up experience.

## 5. Attributes of successful start-up ecosystems and the tools for developing them

To find the common attributes and underlying ways in which countries fuel their start-up ecosystems, the authors interviewed a broad range of global start-up experts, as well as several stakeholders in local ecosystems. These discussions helped identify the seven key attributes of most successful start-up ecosystems (*Figure 2*).



Related to the seven attributes mentioned, specific tools and avenues of development that countries can use to increase both the number of start-ups founded and the success rate of such companies were revealed (Figure 3).



### 5.1. Ease of incorporation and liquidation

Globally renowned, successful start-up ecosystems operate in countries where regulations not only help founders, the operation of firms and investment, but also give them incentives to adopt the right policies and approaches. Laws and administrative processes are constantly adapted to evolving economic conditions.

One core element of establishing a successful start-up ecosystem is a transparent and simple yet fraud-resistant system for incorporating and liquidating ventures. Overly complex, time-consuming incorporation processes may hinder ambitious start-up founders, while a highly bureaucratic liquidation process can prevent founders of failed start-ups from moving on to the next venture without excessive delay. Very few founders get it right on the first try, and experiences of past failures can often be crucial in creating a unicorn.

Hungarian corporate law, and therefore Hungarian practices, are not yet in line with international best practice: Hungary was ranked 87th in the World Bank’s

2019 “Starting a Business” ranking.<sup>9</sup> The stakeholders in the Hungarian start-up ecosystem face two main challenges: finding opportunities for launching a new business after the previous one was liquidated, and navigating the administrative challenges entailed by the process (Jáki *et al.* 2019). The bureaucratic hurdles are one of the key reasons why more than 25 per cent of Hungarian start-ups are registered abroad. These companies hope to benefit from a more transparent regulatory environment, simplicity and better access to funding, according to a Startup Hungary survey.

In addition, excessive red tape can keep away foreign investors: according to Dealroom’s data, only around 16 per cent of total start-up funding in Hungary comes from foreign investors, versus an average of 40 per cent in Europe as a whole and up to 70 per cent in leading ecosystems, such as those of Germany or Israel. In Estonia, the government has acted as a catalyst for the ecosystem by launching a number of legal and administrative initiatives, such as those for e-government, simplified administrative processes, electronic incorporation and e-residency. Initiatives of this kind can increase both the number of start-ups founded and their success rate.

To facilitate the adoption of the most suitable regulatory principles, several countries have put in place so-called start-up committees, which act as independent coordinators between local and national decision-makers and the stakeholders in the start-up ecosystem and advocate on behalf of start-ups when new regulations are formulated. Aiming to improve the framework for high-growth companies, the Austrian Federal Ministry for Digital and Economic Affairs established a start-up committee comprising five experts. The independent body’s main task is to provide professional support to decision-makers by giving content-based advice on regulatory steps that could support the ecosystem’s growth.

## 5.2. Support in securing talent

Once a start-up is up and running, it needs to attract top talent: people who are ambitious, live and breathe the start-up’s mission, and capitalise on their experience to help the company scale toward international success. In the global race for talent, most successful countries have initiatives that simplify the hiring of employees by start-ups.

One way of doing this is to facilitate the employment of international digital talent. Truly ambitious start-ups must generally hire foreign tech and business specialists from the outset who, thanks to their market knowledge and language skills, can help start-ups expand into new markets and scale up on a global level.

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<sup>9</sup> “Starting Business” World Bank. <https://archive.doingbusiness.org/en/data/exploretopics/starting-a-business>

In many cases, even a simplified start-up visa process can go a long way in recruiting international talent. A good example for this is the French “tech visa”, which is actually a simplified and fast-track visa scheme. It helps start-ups grow by assisting employees from outside the European Union in obtaining a residence permit. Between 2017 and 2021, 1,150 start-ups used this opportunity.<sup>10</sup> The visa, valid for four years, is renewable and degree-agnostic. It automatically covers spouses and minor dependent children. Eligible companies must be registered in France (not necessarily as their headquarters) and meet one of the following conditions: 1) Young Innovative Enterprise (JEI) status (a package of tax credits and social contribution exemptions for R&D-heavy start-ups); 2) state funding for innovation within the past five years; 3) French VC backing; 4) membership in a partner accelerator or incubator.

Experts and founders in the survey said that another key tool for hiring talent at start-ups was the ability to give employees stock options. Obviously, start-ups can hardly compete with the salaries of large corporations. They can only offset this problem by involving employees in the future success of the business, the achievement of which depends heavily on the employees, too, so this is a win-win solution.

### **5.3. A favourable tax environment**

International examples show that the appropriate tax policies can ease the initial financial burden on start-ups, encourage better conversion throughout the funding funnel (for example, through the tax benefits offered to start-up investors) and create incentives for successful entrepreneurs who exit to reinvest in the ecosystem. Direct tax benefits to start-ups could come through income tax reductions or through cuts on taxes paid on the salaries of employees, as the Netherlands has done with a 30 per cent tax cut. The latter is a tax benefit offered to skilled employees who relocate to the Netherlands for a specific employment role. When the necessary conditions are met, the employer can grant a tax-free allowance equivalent to 30 per cent of the gross salary subject to Dutch payroll tax.

Tax policies to encourage investment can take the form of income tax benefits tied to venture capital investment. One example comes from France, where exiting founders receive tax relief on the proceeds they use to fund other start-ups, potentially through holding companies. The UK Enterprise Investment Scheme offers tax relief to individual investors who buy new shares and allows those investors to claim an individual income tax deduction of 30 per cent of investments in the start-up. Similar systems exist in Belgium, Germany, Ireland, Italy, Portugal, Spain and Sweden, among other countries.

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<sup>10</sup> According to data from the French Ministry for the Economy and Finance

So far, Hungary has granted no benefits to founders or employees via income tax reductions. Corporate tax deductions for corporate start-up investors are capped at HUF 20 million (around EUR 50,000) over a four-year period. In accordance with Section 7(1)(m) of the Hungarian Act LXXXI of 1996 on Corporate Tax, pre-tax profits are reduced by three times the historic cost of the shares acquired in start-ups (with respect to a capital increase following the acquisition, including the growth of the historic cost) in the year of obtaining the shares and the next three tax years, in equal instalments, but only up to HUF 20 million per tax year and start-up.

#### **5.4. Direct incentives to encourage an entrepreneurship culture**

McKinsey's earlier research (*Berger-de León et al. 2021*) has confirmed that in some cases people from non-traditional backgrounds have a higher interest in founding a company, but are less able to act on their intent. This is also true for mid-career founders (ages 35 to 45), who are more likely to have the right combination of experience and knowledge but may be risk-averse as a result of their comfortable corporate jobs and family priorities. Many successful ecosystems have support programmes targeting such founder segments and help increase the number of new start-ups.

Who starts companies in Hungary? *Jáki et al. (2019)* showed that typical start-up founders were middle-aged men from Budapest, with experience at international corporations or in an earlier business, and around half of the founders had some experience with start-ups. There are very few women in the Hungarian ecosystem, partly because much of the start-ups are related to the ICT sector, where most experts are male. However, a similar gender gap can be observed in Hungary and Europe in terms of the owners of start-ups, 80 per cent of whom are male (*Kézai – Konczos Szombathelyi 2021*).

The gender gap is significant: only around 25 per cent of start-ups created between 2010 and 2020 had at least one female founder (*Startup Hungary 2021*). Yet as noted before, according to *earlier research by McKinsey*, women have a higher interest in founding a company, but rarely do so due to various reasons. Two approaches might make a positive contribution towards eliminating hurdles and closing this gender gap: encouraging mentoring programmes targeting females and increasing public awareness of unconscious bias in funding processes. A positive example for this from the past five years is an Australian initiative for female founders: to help female entrepreneurs overcome disadvantages in gaining finance and support, Australia's government started the Boosting Female Founders Initiative programme, which offers grants of AUD 25,000–AUD 480,000. The programme provides not only targeted support for scaling in domestic and global markets but also expert mentoring and advice. For this project, Australia's government has allocated a total

of AUD 52.2 million in grant funding, over multiple rounds, and AUD 35 million of that has been granted to start-ups in the past three years.<sup>11</sup>

### **5.5. Strategic allocation of public financing**

Public funding for the start-up ecosystem is a powerful tool, but one that requires efficient, well-monitored distribution. In successful ecosystems, grants (e.g. R&D grants) are given to sectors that are strategically important to the economy, and equity funding from public sources is granted in a way ensuring that the state's position is equal to that of any other investor, with strict due diligence and investment KPIs. In CEE countries, there are several areas that are in need of development. *Karsai (2022)* pointed out that in the CEE region state funds (including EU transfers) offer a large supply of capital to a wide range of start-ups, but the selection of the companies is not based solely on market considerations. This can lead to the emergence of a dual market, where start-ups that do not receive funding try to survive on the market.

In practice, start-up funding varies across the CEE countries. In Central and Eastern Europe, the development of venture capital's institutional structure has been imbalanced: 1) among the Baltic states, Estonia and Lithuania chose to liberally regulate the market, and as digitalisation increased, a vibrant venture capital market emerged, producing internationally renowned success stories; 2) in Hungary and Poland the market was divided into two: one group comprised start-ups supported by funds from the European Union and the national budget, while the other included internationally successful and innovative firms that emerged locally with the cooperation of private fund managers; 3) in the other EU countries of the CEE region the strengthening of the market economy is facilitated by EU funds, and the related institutional transformation is well under way; 4) in the countries outside the European Union, VC remains embryonic (*Karsai 2020*).

Two key tools were identified during the investigation of best practice examples of efficiently allocated public funds. First, research grants for areas in strategically important sectors are a proven way of supporting both the domestic start-up ecosystem and the national capacity for innovation. Targeting research grants to strategic sectors has two key benefits: a higher likelihood of success for start-ups that can operate in strong domestic markets and an improvement in the international competitiveness of a nation's key industries. Second, experts agreed that the most efficient way of allocating public funds to the start-up sector was for the government to establish a "fund of funds" that, rather than investing directly, invests through reputable and professional VC funds that already have a track record of strong returns. This approach is generally perceived as more efficient than direct

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<sup>11</sup> Official site of the Australian Government: <https://business.gov.au/grants-and-programs/boosting-female-founders-initiative-round-3>

government involvement in venture funding, because professional VC funds have the necessary experience and rigorous, market-oriented KPIs for returns that ensure the efficient allocation of investors' money.

Although this type of funding has no strings attached, venture capital funds need clear and transparent reporting on the way they allocate resources they receive from the “fund of funds”. A successful example is the Polish Growth Fund of Funds, with over EUR 3 billion under management, intended to stimulate equity investments in growth-focused enterprises in Poland with the help of the professional VC sector.

The importance of innovation in strategic industries is also exemplified by Israel. Israel's population is almost the same as Hungary's (at around nine million), but has a GDP of nearly USD 500 billion, more than 2.5 times that of Hungary. Its economic success is fuelled by both its start-up ecosystem and the strength of its strategic industries, including biotech, cybersecurity, pharma, specialised engineering and technology. To help start-ups, the Israeli Innovation Authority runs a variety of research grant programmes,<sup>12</sup> ranging from general all-access grants to grants for companies founded by minorities.

The Israeli Innovation Authority provides specific research grants for start-ups in sectors that are strategically important to the Israeli national economy:

- The Ideation Incentive Program provides grants of up to USD 30,000 in the initial development stages. It is generally open to start-ups in all industries, but allows for higher grants in biotech and other specialised engineering sectors.
- The R&D Fund's programme provides product development grants to start-ups younger than five years. The recipients innovate in areas with high development risk, such as communications, cyber, hardware, medical equipment and software.
- A programme specifically for cybersecurity provides grants of about 50 per cent of a company's R&D budget (up to about USD 600,000).

## **5.6. Transparency and access**

Leading start-up ecosystems ensure top-notch transparency and credible reporting, typically through databases and digital platforms that serve as the single source of truth on a nation's start-ups and provide guidance on founding and scaling. When the research was conducted, no digital platform served as a single source of truth on Hungary's start-ups, or provided practical guidance for those who might wish to found such companies.

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<sup>12</sup> The details of the programme can be found at the Israeli Innovation Authority's official website: <https://innovationisrael.org.il/en/program/ideation-tnufa-incentive-program>



Stakeholders in the current start-up ecosystem could work jointly to create a platform that would, among other things, provide information and services for start-up founders and investors, as well as structured mentoring and networking for entrepreneurs. The platform's goals would be to enable access to experience and capital and, ultimately, to increase the number of start-ups founded and scaled. An example for this is Startup Estonia, a government initiative with an allocated amount of EUR 7 million. It aims to enrich the start-up ecosystem by mobilising start-ups, incubators, accelerators, other private sector actors and relevant public entities. It covers four main areas: community activation, training programmes for young companies, investor support and the facilitation of administrative processes. It also provides a database of start-ups and relevant service providers, and as of 2022, the database included more than 1,300 start-ups and was catalysing the whole Estonian start-up conversion funnel.

### **5.7. Access to educational opportunities**

Established investors and successful founders in Hungary say that its entrepreneurs have generally low levels of risk-taking and lack the willingness to internationalise. A 2018 Oxford University study found that Hungary was ranked the fourth lowest out of 77 countries on a risk-taking index (*Becker et al. 2018*). To quote the CEO of a Hungarian start-up, Hungary is the “country of inventors”, it has a strong cohort of technically proficient entrepreneurs, but when it comes to business development, they appear to lack the drive and motivation of their counterparts in other CEE countries. As pointed out by *Békés and Muraközy (2012)*, in line with international literature, business growth could be facilitated by trainings improving business management skills, innovation activities and the strengthening of companies' international ties. This is all the more important because growth is largely determined by the idiosyncratic features of the company's management and strategy.

Successful ecosystems use three main tools to ensure that potential founders of start-ups and their employees have the right skills. First, founders get free access to digital, coding and business courses through a start-up platform or subsidised courses at existing local providers. There are examples for this in Hungary, in the form of a programme sponsoring digital education at existing coding schools.

Another typical trait of successful start-up ecosystems is the promotion of an entrepreneurial culture in academia, usually by supporting nation-wide digital entrepreneurship curricula at universities and other academic institutions. Hungary offers an example for this, too: the Hungarian Startup University Programme (HSUP) kicked off in 2020, with more than 2,000 participating students. This was the country's first unified adult education curriculum in start-up entrepreneurship.<sup>13</sup>

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<sup>13</sup> Source: HSUP website, <https://hsup.nkfi.gov.hu/>

Finally, Hungary could utilise the international networks and know-how from the collaboration with start-up-focused foreign universities, such as Stanford in the United States and the University of Aachen in the European Union. Higher education institutions could be encouraged to create incubators or research departments; for example, the Stanford Technology Ventures Program (STVP) forms partnerships with universities around the world to develop programmes and curricula for entrepreneurship education. The programme is designed to maximise the impact that partner universities create in their respective countries.<sup>14</sup>

If Hungarian universities and other education institutions can not only continue but also expand their efforts to educate entrepreneurs, promote entrepreneurship and build international networks, it could promote the founding of several Hungarian start-ups.

## **6. Conclusion**

Although the Hungarian start-up ecosystem lags behind the world's leading ecosystems and the CEE region, it can definitely catch up by capitalising on the internationally renowned Hungarian scientific innovation. The success rate of Hungarian firms could be improved by catalysing the foundation of more start-ups and improving the conversion rate across the maturity funnel.

The present research identified seven main attributes that could boost both the number of start-ups founded and their success rate. In connection with the seven attributes, the avenues of development were determined that could promote the continued development of Hungary's start-up ecosystem.

The basis for ease of incorporation and access to financing is a transparent yet fraud-resistant system for incorporating and liquidating ventures, with much less red tape than today, and a direct advisory committee comprising stakeholders from the ecosystem that could help keep start-up regulations up to date.

Having access to skilled labour and a talent pool is a crucial, or perhaps even the most important, feature. In this respect, the international competition is intensifying by the year, with several countries introducing various initiatives to attract international talent to their own start-up scene. To allow Hungarian start-ups to access the appropriate talent, a transparent stock option scheme or a special visa targeting start-up workers could go a long way.

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<sup>14</sup> "Global partnerships": Stanford Management Science and Engineering.

Furthermore, the countries with successful start-up systems offer a favourable tax environment to firms. This can take the form of direct tax credits tailored to start-ups or even “reinvestment” benefits, in other words incentives for investor and entrepreneurs after a successful exit to reinvest their profits in the start-up ecosystem in exchange for preferential taxation.

Direct incentives to bolstering entrepreneurship are justified because in successful ecosystems the “mystery” of launching a business is not necessarily associated with the archetype of a risk-taking young male. International studies have found that an ecosystem can benefit greatly from encouraging incorporation with subsidies and mentoring programmes targeting various groups (e.g. female founders, mid-career professionals).

Strategic allocation of public financing is a key attribute that determines the differences between various countries. This paper found the most successful models with two types of state funding. Grants exert the largest impact if they target strategically important industries to encourage innovation, and with public equity investment the “fund of funds” method proved to be the best. This means that the state, similar to any other private investor, invests in professional private equity funds with strict KPIs, thereby indirectly financing the start-up ecosystem.

Transparency and knowledge sharing can be ensured through databases and digital platforms that serve as the single source of truth on a nation’s start-ups and provide practical guidance on founding and scaling.

Finally, the seventh key attribute is the training of founders and professionals, which can be implemented through free access to digital, coding and business courses, the continued strengthening of the curricula relevant for digital businesses in higher education institutions, and international scientific partnerships.

If progress can be made in the identified areas through the close cooperation among the stakeholders in the sector, Hungary has a chance to create a thriving start-up scene that can help buoy the economy as a whole.

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