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# Speed as key succes factor for scale-ups

## The Dutch scale-up ecosystem in international perspective

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# Summary

This report examines why speed has become a decisive success factor for technological start-ups and scale-ups, and what this means for the Dutch scale-up ecosystem in international perspective. Europe and the Netherlands have a strong base of innovative start-ups, but too few companies manage to grow rapidly into internationally competitive scale-ups. This matters because delays in scaling increase the risk that promising companies fail, relocate, or are acquired by foreign competitors, thereby weakening the Netherlands' future earning capacity and strategic position in key technologies.

The international comparison shows that countries differ strongly in how quickly start-ups progress through funding stages and reach scale-up status. The United States benefits from deep venture capital markets, a large integrated home market, strong entrepreneurial ambition, extensive technical talent, and a more streamlined regulatory environment. China and Singapore illustrate that state-driven approaches can also accelerate ecosystem development, but only under specific institutional conditions and with substantial resources. These examples cannot be copied directly to the Dutch context, but they do reveal which ecosystem conditions are important for faster scaling: access to capital, talent, infrastructure, market demand, regulatory flexibility, and a culture that supports entrepreneurial ambition and risk-taking.

For the Netherlands, the analysis shows that the challenge is not primarily a lack of promising start-ups, but the difficulty of turning technological potential into rapid and sustained growth. At ecosystem level, the main bottlenecks are access to later-stage risk capital, shortages of specialized technical talent, limited access to testing facilities and production space, grid congestion, regulatory complexity, and fragmented support structures. These constraints interact with each other: a company may have a strong technology, but still lose valuable time because financing, permits, facilities, talent, or market access are not available at the right moment.

At firm level, scaling requires companies to move from technological development to commercial execution. Deep tech and high-tech start-ups often face a difficult transition from pilot projects to scalable products, while they still lack stable revenues and need to build capabilities in manufacturing, business development, leadership, and market access. The report therefore highlights that speed is not only determined by external ecosystem conditions, but also by the ability of firms to develop the organizational and commercial capabilities needed to turn technological promise into market traction.

The report concludes that accelerating the growth of Dutch technological start-ups requires a coherent ecosystem approach rather than a single policy intervention. Key recommendations are to strengthen later-stage scale-up finance, invest in technical talent and leadership capabilities, improve access to test facilities and physical infrastructure, simplify and better align regulation, use public procurement more strategically, improve coordination across support organizations, and further harmonize European rules to enable companies to scale across borders. Taken together, these measures can help the Netherlands retain promising firms, shorten the path from innovation to market, and strengthen its position in strategic technologies.

# Contents

# 1 Introduction

Alarming analyses, such as those by Mario Draghi (Draghi, 2024) and former ASML CEO Peter Wennink (Wennink, 2025), indicate that Europe and the Netherlands are losing ground compared to the rest of the world. The core message is clear: without a significant acceleration in innovation, investment, and scaling, there is a risk of falling structurally behind in strategic technologies. Speed has therefore become a decisive factor for both global competitiveness and strategic autonomy.

To become a key player in strategic technologies we need new companies that bring these technologies to market and grow to become significant players on the global stage. While Europe and the Netherlands have a significant number of technological start-ups, they often struggle to scale rapidly. In the Netherlands, currently only 21,6% of start-ups grow into scale-ups (Techleap, 2026). For high-tech start-ups, this percentage increases to 38,5%. One of the most important reasons that start-ups do not reach the scale-up stage is that there is often a significant gap between the investments of the development of the product and the first revenues, the so-called valley of death. Therefore, it is essential to speed up this process and minimize any delay in getting the product to market.

The consequences of a potential delay are significant. Promising companies fail to reach their growth potential and go bankrupt, are acquired by international competitors, or choose to relocate their activities to more favorable ecosystems in foreign countries, including the United States or China. As a result, the Netherlands loses control over strategic technologies and high potential start-ups and with that its future earning capacity.

Large-scale investments are often proposed as the solution (EIB, 2024). Following the example of countries such as China and the United States (US), the Netherlands is urged to invest billions in strategic sectors to strengthen its position. International examples show that such investments can indeed play a role in accelerating innovation and scaling. However, the question remains to what extent these foreign examples can be directly applied to the Dutch context.

The Netherlands differ fundamentally from these countries, both in institutional background, culture and size of the country, which impacts the labor force and accessible internal market. In this report we therefore aim to provide a more detailed analysis of the scale-up ecosystem in the Netherlands and go beyond solutions that are simply copied from other countries. Each country and ecosystem has unique characteristics and therefore requires tailored interventions to accelerate the process of scaling a technological start-up.

We combine data-driven insights on the entrepreneurial ecosystems of various countries with an in-depth case study of the Dutch ecosystem. The focus in our analysis is on technological scale-ups, and we pay special attention to the impact of speed during the scaling process. Based on our analysis, we provide concrete recommendations to increase the speed of scaling in the Netherlands.

## 1.1 State of the art

In this report we investigate factors that influence the speed of scaling. To frame this debate, we first need to clarify a few terms. The term scaling describes the process of increasing the size of operations of a firm. This means the firm has already developed its first product and has its first customers, and in the next step the firm wants to expand to a larger market, sometimes internationally, and to do so scale up the different processes in the firm. One can make a distinction between scaling up and high-growth, as high-growth is normally (but not always) the outcome of the process of scaling.

Scaling or high-growth is not necessarily restricted to young firms (see e.g. ECE, 2025a), but in this report we will restrict our attention to the group of young firms. This means that we will mainly study the transition from start-up to a scale-up. In quantitative terms, these groups are often described based on their funding. A new firm is normally considered a start-up once it has raised at least $100,000 in funding and a scale-up when it has raised $10,000,000 in funding (or even $100M (Dealroom, 2025)). More qualitatively, the Dutch government uses the following definition: "*A start-up is a young innovative technology-driven company with the ambition to grow internationally, while a scale-up is a high-growing firm with a validated business model*" (EZ, 2025b).

If we look at the Dutch start-up landscape (Table 1.1), we can observe that there are quite a large number of new firms, but the number of firms with significant funding is rather small. Using a strict definition of scale-ups, we could even conclude that there are only 67 of them in the Netherlands. The observation that there is a significant gap between new firms, funded start-ups and scale-ups is confirmed by the data in Table 1.2 and 1.3. The difficulty in scaling firms and in general in commercializing new knowledge has been called the innovation paradox. This problem has been observed often in the EU (e.g. European Commission, 1995) and in the Netherlands in particular (van der Horst, 2025).

**Table 1.1:** Number of Dutch firms by funding (2026)

| | Total | Verified entries | **>$100K** | **>$10M** | **>$100M** | **>$1B** |
|---|---|---|---|---|---|---|
| **Number of Dutch firms** | 62,226 | 22,487 | 2,892 | 515 | 67 | 2 |

*Source: Dealroom (n.d.). The first column includes all Dealroom entries, while the second column only includes entries verified by humans.*

The difference with other countries illustrated in Table 1.2 is remarkable. Especially in the US and China, significantly more start-ups reach scale-up status. This gap is especially large when comparing the firms that move from series A to series B.[1] While in the Netherlands only 24% of the firms reach this next stage, this is 39% for both the US and China. A similar pattern is observed in Table 1.3.

[1] Pre-seed focuses on idea validation and building an initial MVP, Seed on market research, product development and hire early team members, Series A on scaling a proven business model and establishing repeatable growth, Series B on accelerating market expansion and scaling operations, Series C on expanding into new markets and scaling the company (Reiff, 2026).

**Table 1.2:** Percentage of firms reaching the next funding stage (2026)

| Stage | Pre-seed (100K) to seed ($1M) | Seed (1M) to Series A ($4M) | Series A (4M) to series B ($15M) | Series B (15M) to Series C ($40M) | Series C (40M) to Mega ($100M) | Mega (100M) to Mega+ ($250M) |
|---|---|---|---|---|---|---|
| **Netherlands** | 21 | 22 | 24 | 28 | 1.9 | 0.6 |
| **US** | 29 | 34 | 39 | 38 | 4.1 | 2.1 |
| **China** | 18 | 25 | 39 | 28 | 4.5 | 2.9 |
| **UK** | 22 | 27 | 31 | 34 | 1.9 | 0.9 |

*Source: Dealroom (n.d.). Reaching the next stage is defined as getting a new round within 36 months.*

**Table 1.3:** Percentage of start-ups reaching scale-up status

| Year | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|---|---|---|
| **Netherlands** | 13 | 14.2 | 17.8 | 19.8 | 20.3 | 20.8 | 21.6 |
| **Europe** | 14.3 | 15.6 | 17.9 | 20.4 | 21.4 | 22.7 | 24.1 |
| **USA** | 34 | 37 | 44.2 | 48.5 | 49 | 50.1 | 52.2 |

*Source: Dealroom and Techleap (2026).*

The previous table shows patterns for the general start-up landscape. In Table 1.4 we specifically consider deep tech start-ups. In this table a division is made between deep tech and non-deep tech start-ups, where deep tech is defined as ‘companies whose core technology is rooted in scientific advances or engineering innovation’. The table only refers to Dutch start-ups. Although there is a generally upward trend in the ability to scale, the difference between deep tech and non-deep tech start-ups is large with deep tech start-ups being almost twice as likely to reach scale-up status. This large difference might be attributable to the stronger fundamentals of these companies, which are for example also more likely to own intellectual property. At the same time, these start-ups require more money to develop a product in the first place, which means that they logically have to aim for larger rounds of funding. Therefore, there is discussion about whether the definition of a deep tech scale-up should be based on a different funding cut-off, such as $100M.

**Table 1.4:** Percentage of deep tech start-ups reaching scale-up status

| Year | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 |
|---|---|---|---|---|---|---|---|
| **Deep tech** | 21.7 | 21.5 | 28.2 | 29.4 | 30.6 | 34.2 | 38.5 |
| **Non-deep tech** | 13 | 14.2 | 17.9 | 19.9 | 20.3 | 20.7 | 21.6 |

*Source: Dealroom and Techleap (2026).*

However, this scale-up ratio does not say anything about the speed of scaling. The numbers in previous tables represent a comparison of the current group of start-ups and scale-ups and do not follow start-ups through time. In general, existing entrepreneurship databases (such as Dealroom, Crunchbase, Pitchbook) do not allow for simple comparisons over time as they only provide snapshots of the current situation. However, Techleap (2026) represents some insight into the speed of scaling by following start-ups over time and performing a hazard model on the likelihood of going from start-up to scale-up. Interestingly, deep tech start-ups

scale faster from start-up (100K) to scale-up (10M). This could relate to the higher investment needed for the initial product development as discussed above.

There is not much literature studying the speed of scaling, although some research suggests that the time it takes for a European start-up to go from e.g. series A to series B is about 5.8 years in Europe (Bregeras, 2025) while it only takes 2.3 years in the US (Crunchbase, 2023; 2024). This is a huge gap and is mostly visible at later stages, for example from seed to series A, it takes about 2.5 years in Europe vs 2.1 year in the US. The slower progression of start-ups through the different funding stages is often observed in popular media (e.g. NOS, 2026, FD, 2024) as well as in policy reports (e.g. Techleap 2026, Wennink, 2025). It is linked to various problems in the start-up landscape and used as an explanation for why Europe is falling behind other countries.

In this report we will explore the scaling process of firms in the Netherlands and place it in an international context through an in-depth comparison with other countries. Our aim is to identify causes that affect the speed of scaling and look for potential improvements to help start-ups scale faster. Speed is extra important because of external geopolitical pressure and the need to become technologically sovereign, i.e. to not depend on other countries for critical technologies. To provide a comprehensive understanding of scaling barriers in the Netherlands, the challenges are analyzed at two distinct levels: the ecosystem level and the firm level. The ecosystem level focuses more on external factors affecting scale-ups, while the firm level identifies internal factors including the motivation and management skills of the entrepreneur. By combining these perspectives with a detailed international benchmark, this study aims to identify key drivers of scaling and uncover opportunities to strengthen the Dutch scale-up ecosystem. We will investigate this using the following research questions:

- What does scaling a technological start-up look like in different countries? Why can start-ups scale faster in some countries than in others?
- What challenges do start-ups face when scaling a technological start-up in the Netherlands?
- What potential improvements can we propose to accelerate the scaling of technological start-ups?

## 1.2 Methods

In this report we will mainly focus on young innovative companies that can either be considered high-tech or deep tech. We rely both on interviews with entrepreneurs and other stakeholders in the Dutch entrepreneurial ecosystem, such as knowledge institutes and policymakers, as well as desk research based on academic articles and policy documents. Most of the companies we interviewed can be considered early scale-ups, with a few start-ups among the respondents. All of the companies are part of the National Growth Fund program NXTGEN Hightech. In total we interviewed 9 entrepreneurs and 8 stakeholders in the Dutch entrepreneurial ecosystem.

We also conducted an international benchmark to compare scale-up ecosystems across the world and distil important success factors. To limit the scope of this benchmark, we decided to focus on the most prominent examples of entrepreneurial ecosystems with high numbers of start-up and scale-ups (Dealroom, 2026). In addition, we wanted to look at a variety of ecosystems which use different approaches to scaling. We therefore focus on the entrepreneurial ecosystem of the United States which is mostly based on a liberal, bottom-up approach and the entrepreneurial ecosystem of Asian countries which is largely government-driven. For Asia we mostly focus on China and Singapore, Singapore is added as an interesting example as it is closer in size to the Netherlands and can also be characterized as

a very open economy. However, we are sometimes limited by the (quantitative) data availability, which is especially the case for China.

## 1.3 Reading guide

This report is structured as follows. Chapter 2 provides an international comparison of entrepreneurial ecosystems and examines why some countries enable faster scaling than others. Chapter 3 focuses on the Dutch context and discusses the main ecosystem-level and firm-level barriers that affect the speed of scaling. Finally, Chapter 4 presents the main conclusions and translates the findings into recommendations to accelerate the scaling of technological start-ups in the Netherlands.

# 2 International comparison

The pace and success rate at which start-ups transition into competitive scale-ups differs significantly across countries, as we saw in Chapter 1. In this chapter we explore the differences in scaling a technological start-up in different countries. To do so we will mostly rely on the entrepreneurial ecosystem lens (see e.g. Leendertse et al., 2022), as this approach aims to explain how the environment affects entrepreneurs. We will explore differences in the context of entrepreneurship using various data sources and academic literature. To structurally compare the environment affecting the scaling process in these countries we will discuss several elements of their entrepreneurial ecosystems, based on frameworks such as those proposed by Stam and Van de Ven (2021) and Acs et al. (2014).

Countries such as the United States and China have developed environments that facilitate faster growth, characterized by deep capital markets, abundant technical talent, and large, integrated domestic markets. Emerging hubs, including Singapore, demonstrate alternative, more state-driven approaches to ecosystem development. This global perspective provides important context for understanding Europe's relative position and highlights both the opportunities and limitations of translating international models to the Dutch context.

## 2.1 Institutions

First of all, the institutional context significantly differs between North America, Europe and Asia. Going back to Baumol (1996) we know that the institutional environment significantly impacts how and in what direction entrepreneurship is developed. On a basic level, property rights need to be enforced so as to allow entrepreneurs to appropriate their profits, on the other side entrepreneurs should be protected when their firm goes bankrupt. In addition, free markets should be enforced and enable new entrants in the industry. This relates to the strength of the rule of law and the protection against corruption in a country, as measured in Table 2.1.

The numbers show a relatively positive picture of most countries, with China being the significant exception The rule of law and the control of corruption is scored very low for China. China also shows the most stringent regulation of the product market which inhibits competition. There are also significant differences in the tax rate with Singapore and the UK having the lowest tax rate. This might be somewhat surprising as the US is traditionally known as a very liberal economy. Note that this data represents the period 2020-2023 and does therefore not reflect any recent changes, for more information on the data collection see the Appendix.

More in general, the institutions in each of these countries show different configurations which have been referred to as 'varieties of capitalism' (Hall & Soskice, 2003). Which differentiates between liberal market economies, such as the US and UK, and coordinated market economies, such as Germany. The most important difference between these economies is the regulation of their labour and financial markets, with liberal market economies being largely deregulated. Although this traditional framework does not encapsulate Asian economies, it has been suggested that China with its state-guided socialist economy might be its own category (e.g. Peck and Zhang, 2013), which could be called the guided market economy (Krause et al., 2024). Similarly, the model of Singapore,

while closer to a liberal economy, might be its own variety which is heavily reliant on government steering.

Studies exploring how these institutions affect entrepreneurship have shown that different types of institutions indeed encourage different types of entrepreneurships. Countries with a liberal market economy have the most favourable environment for more radically innovative new ventures, whereas countries with coordinated market economies are more likely to see less innovative or more low-tech ventures (Dili et al., 2018). The model of China has been less studied, although it is a significantly different way of organizing entrepreneurial ecosystems. (Cai et al., 2024) and while China is becoming a strong entrepreneurial economy (Yoon, 2021), data availability is still limited to study this in more detail. In addition, anecdotal evidence of big entrepreneurs being hindered by the state (see e.g. the 'tech crackdown' (Economist, 2023)) also provides an interesting counterexample of the relatively successful entrepreneurial environment in China.

**Table 2.1:** Measures of the institutional environment in different countries

| | NL | US | UK | China | Singapore |
|---|---|---|---|---|---|
| Rule of law (index 0 (worst)-100 (best)) | 91.0 | 92.5 | 91.0 | 46.99 (2024) | 81.60 (2024) |
| Control of corruption (index 0 (worst)-100 (best)) | 97.9 | 92.2 | 94.5 | 49.65 (2024) | 87.69 (2024) |
| Product market regulation (0 (more competition friendly)-6 (less competition friendly)) | 1.0 | 1.6 | 1.0 | 2.59 (2024) | - |
| Effective tax rate (% of taxable income) | 23.5 | 20.8 | 16.4 | 22.9 | 16.09 |

*Source: OECD (2025). Data for China and Singapore were taken from the World Bank (2025) and OECD (2026; n.d.). For more information about the data collection, see the Appendix.*

## 2.2 Governance / rules and bureaucracy

One of the most important influences that institutions have on entrepreneurship is the shaping of rules and policies that affect entrepreneurs. This ranges from regulations on how you register a business to R&D support measures or labor market policies. While this range is too broad to cover in the current analysis, we will touch upon some of the most important points here. The World Bank has been measuring the environment for doing business for some time now, and the most recent numbers of the B-ready indicators are shown in Table 2.2. Unfortunately, the Netherlands and China are not a part of this initiative which makes the comparison more limited. However, we do see that while the US has the most favorable regulatory environment, relating to aspects such as labor protection and dispute regulation, Singapore scores highest on public services and operational efficiency. These last two measures relate mostly to how easy it is for businesses to comply with the regulations, and which facilities are there to help them.

While not an ideal proxy, we could look at Belgium as a somewhat similarly regulatory environment to the Netherlands. Belgium scores 74.08 on regulatory framework, 70.77 on public services and 68.16 on operational efficiency. This is significantly lower than the countries shown in the table and even puts Belgium outside of the top 20% for regulatory framework and operational efficiency.

**Table 2.2:** Measures of the business environment in different countries (2025)

| | US | UK | Singapore |
|---|---|---|---|
| Regulatory framework (0-100 (best)) | 78.67 | 77.65 | 77.64 |
| Public services (0-100 (best)) | 73.04 | 73.52 | 75.27 |
| Operational efficiency (0-100 (best)) | 68.02 | 71.25 | 79.25 |

*Source: World Bank (2025). No data was available for China and the Netherlands.*

These scores mirror an important concern that is often voiced by entrepreneurs and also discussed in the Draghi report (Draghi, 2024) concerning the complicated regulatory environment in European countries. The European Union in particular is known for its many rules, which also often differ by member state. A recent OECD study (OECD, 2026) verifies these concerns for the biotechnology area, stating that while not everything is necessarily worse, the regulatory environment in the US is in general more streamlined and less fragmented. This means that not only are European markets more regulated in general, as shown by the coordinated market economy discussion above, these rules are also fragmented and not unified across the European Union. While this issue has been raised, most noticeably by Letta (2024), it is still subject to discussion in the European Union and prevents a true single market approach.

It is clear that the regulatory environment in the US is more favorable for scaling businesses, with less internal borders and more freedom. For China the case is less clearcut, as the government interferes heavily in markets. However, when certain innovations are a priority for the government, as outlined in the five-year-plans, there seems to be quite a lot of room for experimentation (e.g. there are less limitations with respect to data privacy (Yoon, 2021). In the European Union projects are currently underway with regulatory sandboxes, which provide start-ups with more leeway to experiment while they are still developing their products. However, these initiatives are still relatively limited (EPRS, 2026).

## 2.3 Culture

Next to the formal institutions that were just discussed, informal institutions or cultural norms and values also have a significant impact on entrepreneurship and the ability of entrepreneurs to scale. The success of some of the world's most significant entrepreneurial ecosystems has been largely attributed to a strong entrepreneurship culture, an aspect which had been put forward by AnnaLee Saxenian who studied the ecosystems of Silicon Valley and route 128 in the Boston Area (Saxenian, 1996). A strong reciprocal culture where founders know and help each other can greatly contribute to the entrepreneurial success in a region. On a more fundamental level, there should also be trust between people to enable economic transactions and to support collaboration (e.g. Zak and Knac, 2001).

In Table 2.3 we compare several measures of entrepreneurial culture and a more general measure of trust. The data shows large differences between countries. The Netherlands scores highest on considering being an entrepreneur a good career choice, this potentially reflects the relatively large number of people working as entrepreneurs but especially as solo entrepreneurs. Due mostly to fiscal advantages it has been very attractive to work as a solo entrepreneur instead of being an employee for many years, although the government has recently been tightening these rules to prevent 'fake entrepreneurship' (NRC, 2025). The US,

UK and China all score relatively high on this measure, while Singapore is a negative outlier (see textbox on page 14).

The second indicator shows quite a different ranking of these countries, here China is clearly leading, closely followed by the UK and US. These countries all have cultures in which entrepreneurs are considered superstars, while this might be most obvious for the US with names like Jeff Bezos and Elon Musk, similar superstar entrepreneurs exist in the UK (e.g. Richard Branson) and China (especially Jack Ma). This indicator links clearly to scaling as successful entrepreneurs are normally judged by the size of their firm or profits. The status assigned to successful entrepreneurs might thus positively influence the ambitions of new start-ups (Wyrwich et al., 2016). In the Netherlands, the low position of this indicator forms a stark contrast with the high score on the first one. While Dutch people thus value entrepreneurship as a career path, they do not particularly value successful entrepreneurs. This has sometimes been called the lack of 'ambitious entrepreneurship' (Stam, 2013) in the Netherlands and might be connected to the lower number of scaling businesses.

**Table 2.3:** Measures of entrepreneurial culture and a measure of trust in different countries

| | NL | US | UK | China | Singapore |
|---|---|---|---|---|---|
| Entrepreneurship as a good career choice, % of 18-64 population | 82.8 (2017-2019) | 75.4 | 69.7 | 71.9 (2022-2024) | 51.7 (2014) |
| High status to successful entrepreneurs, % of 18-64 population | 69.0 (2017-2019) | 79.4 | 81.8 | 85.0 (2022-2024) | 62.9 (2014) |
| Trust in others, % respondents | 61.4 | 38.7 | 46.0 | 63.5 (2018) | 34.4 (2020) |

*Source: OECD (2025), GEM (n.d.), World Values Survey (2022).*

The last indicator relates to general trust in society and shows the greatest differences between countries. China scores the highest, which might reflect the generally more collectivist culture (Hofstede, 1980), while the more individualistic cultures of the US and UK score lower. Also, Singapore scores very low on this measure, which seems surprising given the size of the country and the high level of welfare. While low levels of trust might inhibit interaction and investment, the level of trust can differ on various levels. Trust within a specific region or network is therefore potentially more determining for entrepreneurship and scaling than an overall national measure. The importance of regional level trust was for example quite clear in the development of the ecosystem in Oulu, Finland, and Eindhoven, the Netherlands. Both of these regions had large companies (Nokia and Philips) in which many people worked together, and this collective background (and common culture) proved to be a fertile breeding ground for new businesses (Schrijvers et al., 2024).

Singapore - A case of government-push Singapore is a small island state which was founded as a British colony because of its strategic location in 1819. It provides an interesting example of a strongly steering government that intended to promote innovation and entrepreneurship after revenues from export and finance decreased. While the state is a parliamentary democracy, the system is such that the party with the simple majority wins and takes control of the cabinet. In fact, this means that only three different prime ministers have been leading Singapore so far. In addition, the government is used to interfering quite heavily in the lives of its citizens. This combination means that the ecosystem in Singapore is strongly directed by the government.

After the financial crisis in 2001, Singapore decided to invest heavily in innovation and especially in a cluster for biomedical sciences. It established scholarships for talent, reduced corporate tax rates and built a new research complex called Biopolis. While this heavy investment in R&D led to a big increase in patenting and technological innovation, there was not one new life sciences company created after several years. In fact, we could say that Singapore experienced an extreme innovation paradox in which none of the research it developed reached commercialization. This observation, together with the financial crisis of 2007-2009, lead to a new strategy which focused on the commercialization of R&D. This included a shift in funding to more applied R&D and establishing partnerships with entrepreneurial universities like MIT.

Even after this change and in a support system focused on innovation and entrepreneurship, there still seems to be little interest in founding new businesses. Singapore still lacks behind on various entrepreneurship indicators, which largely seems to do with the culture. A top-down government does not lead to an environment in which risk-taking and personal freedom is in general hugely valued. To change this, more is needed than the establishment of partnerships with world-class institutions and the building of brand-new and excellent facilities. As an MIT lecturer observed, the current result was summarized by the completely empty incubator facilities. A state with a huge innovation capacity but almost no entrepreneurial activity

*Source: Murray & Buden (2015)*

In addition to the measures provided above, an important determinant of entrepreneurship and especially for technological entrepreneurship is the amount of risk people are willing to take. Given the high uncertainty involved in (deep) tech entrepreneurship, people need to be willing to tolerate high risks and probability of failure. While the Global Entrepreneurship Monitor provides some data on this, this data is hard to compare as the question is only asked to people who actually perceive opportunities for starting a business (GEM, n.d.).

Looking at general measures of risk taking, these show that European and Asian countries are relatively risk-averse, while North American countries are relatively risk-loving (Falk et al., 2018). Follow up research has confirmed that this risk-averseness indeed affects entrepreneurship (Hechavarria et al., 2026), although this negative effect can be attenuated by high trust.

## 2.4 Venture capital

As already explored in Chapter 1, funding is one of the underlying reasons explaining the speed of scaling. While successful businesses generally attract more funding to a region[2], the availability of funding can also significantly affect the ability of ventures to scale. Table 2.4 shows some data on the availability of venture capital. There are clear differences in the availability of venture capital between the Netherlands and the United States, both in absolute terms and relative to GDP. At the early stage, venture capital availability amounts to 38.73 USD per capita in the Netherlands, compared to 257.28 USD per capita in the United States. This gap widens significantly at later stages: 26.64 USD per capita in the Netherlands versus 319.63 USD per capita in the United States. While the UK is more similar to the Netherlands regarding the availability of early-stage funding, also here a gap emerges for later stages. These numbers show that the difference in funding becomes especially relevant after the first few years of the company lifecycle, i.e. when companies start scaling. While different countries can rely on different types of funding, such as bank capital or government grants, the third indicator shows that the lack of venture capital is not adjusted for by the availability of capital provided by banks. The final row of the Table shows the amount of venture capital registered in Dealroom, a database that is used by investors and companies. It again confirms the pattern observed above, with the US leading significantly in venture capital. The data on China shows that it seems to outperform European countries but lacks behind the US.

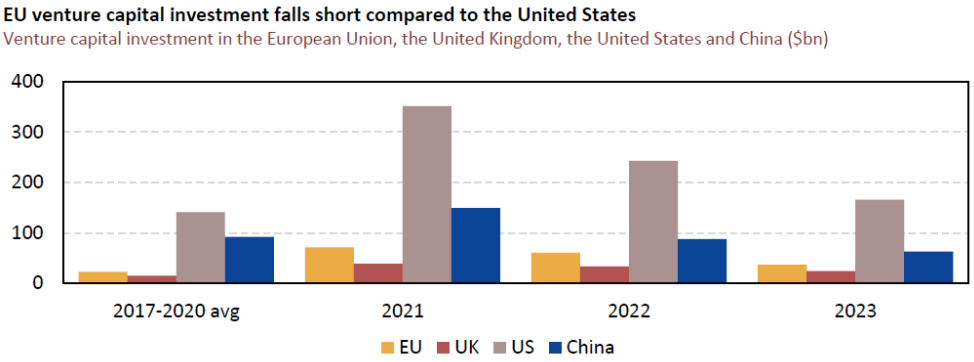
**Table 2.4:** Availability of venture capital and bank loans in different countries

| | NL | US | UK | China |
|---|---|---|---|---|
| Early-stage VC (USD per capita) | 38.73 | 257.28 | 34.39 | - |
| Later-stage VC (USD per capita) | 26.64 | 319.63 | 32.92 | - |
| SME loans (thousands USD per capita) | 6.4 | 38.6 | 3.0 | 5.8 |
| Dealroom VC invested (billion USD) 2025 | 3.3 | 282 | 24 | 34 |

*Source: OECD (2025), Dealroom (n.d.). Data for China was also taken from OECD (2026).*

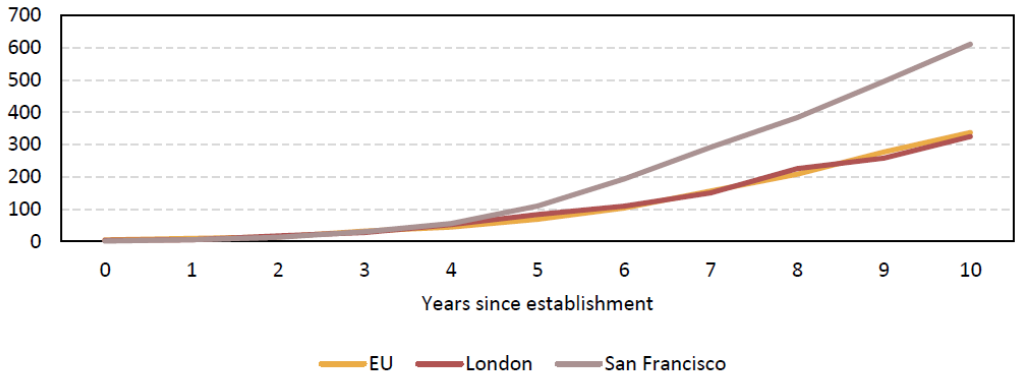
A recent study by the European Investment Bank confirms these findings see Figure 2.1. This shows that in China the absolute amount of venture capital available is higher than in the EU. However, sources for this type of financial data are normally very US- (Crunchbase, Pitchbook) or EU-oriented (Dealroom), so we should be careful with interpreting these results as these might underrepresent the availability of capital in China. Another graph from this study, as shown in Figure 2.2, confirms the observation in Chapter 1. The graph illustrates that while during the first four years the amount of funding raised by European and American businesses is quite comparable, a significant gap emerges after the fourth year.

[2] This thus makes it hard to make any causal claims regarding funding. While entrepreneurs often complain about a lack of capital, investors often refer to a lack of promising businesses to invest in.




Source: Authors' calculations based on data from PitchBook Data, Inc.
Notes: The data include total $ billion by region and year and companies from the four regions considered. The period 2017-2020 refers to yearly averages. The data have not been reviewed by PitchBook analysts.

**Figure 2.1:** Comparison of venture capital investment in different countries (EIB, 2024)




Source: Authors' calculations based on data from PitchBook Data, Inc.
Notes: The sample consists of a strongly balanced panel of companies that are at least ten years old with at least one completed deal between 2013 and 2023 with a market valuation of between $500 million and $10 billion. The data have not been reviewed by PitchBook analysts.

**Figure 2.2:** Cumulative capital raised by scale-ups over the company lifecycle (average, current $m) (EIB, 2024)

There are several reasons for the gap in funding between Europe and other countries. The venture capital market in Europe is relatively less developed, with most assets residing with traditional banks (EIB, 2024). In addition, the capital market in the European Union is fragmented with relatively low cross-border investments. The difficulty in attracting capital for scale-ups is also related to cultural characteristics, in particular the relative risk averseness of European households and institutional investors (see e.g. Commission, 2025).

The most commonly proposed solution is government venture capital, as also suggested in a report by the European Investment Bank (2024), and as proposed by the new cabinet in the Netherlands, in the shape of a new Dutch investment bank which is currently being developed (Nationale Investeringsinstelling (Coalitieakkoord, 2026)). While these initiatives can help scaling businesses to raise money and concern significant sums of money, such as the €5 billion Scale-up Europe Fund, it is good to realize the differences between public and private venture capital. As various papers describe (Lerner & Nanda 2020, Scheidgen &

Hruskova, 2024), venture capitalists in Silicon Valley are very hands-on and work as network brokers. Venture capitalists are often strategically involved on the boards of the companies they invest in, while simultaneously helping them to access relevant resources.

This type of involvement is difficult to replicate with a public investor, both because these are less likely to be as involved in the firms they support and the policymakers at these institutions might miss the entrepreneurial experience VC investors often have. The discussion on how government should be involved in business and industry relates to a broader revival of industrial policy initiatives and also replicates some of the concerns. These concerns relate to the potential for political capture (i.e. corruption) but also the difficulty of 'picking winners'. In general, while there is evidence showing it might be effective to support broader sectors with policy initiatives, this evidence lacks for the support of specific firms (Juhasz et al., 2024; Lane, 2025).

## 2.5 Human capital

Talent is a key element of any entrepreneurial ecosystem. An educated population is essential to absorb newly produced knowledge and apply this knowledge either in existing businesses or in new start-ups (Qian & Acs, 2013). This requires a combination of skills, both more traditional, such as scientific knowledge, but also digital skills and entrepreneurial skills. Table 2.5 provides an overview of various indicators for different types of skills. The number of years of formal schooling is highest for the US and UK, with the Netherlands and Singapore following closely. China lags behind significantly, while this might be partly attributable to the somewhat older data, this might also have to do with the inequality in China where some of the more rural regions might have lower amounts of schooling (Liu et al., 2024).

Looking at the Pisa scores on schooling outcomes, Singapore leads by a substantial amount and scores highest on all three elements of the test; mathematics, reading and science (OECD, 2022). This might make it an especially suitable place for innovation and technological start-ups. The other three countries are relatively close together, although the latest Pisa scores for science shows a gap between UK and US (500 and 499) and the Netherlands (488). For digital skills, which is approximated with internet users, all countries score relatively high with the US leading and China having the lowest amount of internet users, again probably due to regional differences.

While these general skills are important to be able to understand and apply new knowledge, it is also essential to have entrepreneurial skills to start a business. The Global Entrepreneurship Monitor (GEM, n.d.) measures these skills with a survey among the adult population (18-64), note that these skills are perceived and subjectively assessed. This measure shows some striking differences between countries. While in the US, China and the UK a majority of the population thinks they have the necessary skills to start a business, this is not the case in the Netherlands and Singapore. In Singapore only one in five people believe they have the necessary skills, although this data point is relatively old. These differences should be interpreted in the light of culture, when entrepreneurship is not a desirable career choice people might not want to invest in those skills. However, entrepreneurship education has been proven quite successful in increasing the intention to start a business and can therefore be an important tool to stimulate entrepreneurship (Martinez-Gregorio et al., 2021).

**Table 2.5:** Measures of human capital across different countries

| | NL | US | UK | China | Singapore |
|---|---|---|---|---|---|
| Mean years of schooling, years | 12.6 | 13.7 | 13.4 | 7.95 (2020) | 11.9 (2020-2022) |
| Pisa, score | 485.7 | 490.9 | 496.6 | - | 559.7 (2022) |
| Internet users, % of population | 93.2 | 96.8 | 95.1 | 77.5 | 94.8 |
| Perceived entrepreneurial capabilities, % of 18-64 population | 44.3 | 61.1 | 53.0 | 52.9 (2022-2024) | 21.4 (2014) |

*Source: OECD (2022; 2025), UNESCO (n.d.), World Bank (n.d.), GEM (n.d.).*

Especially for technological start-ups, having enough people with the right technical background is essential to grow the company. This is often a potential bottleneck as the supply of STEM personnel is limited and many companies look for people with similar skills. For example, in the Netherlands there is a severe labor shortage in many of the technical sectors (TNO Vector, 2025). One of the potential solutions for this is to attract international talent with the required skills. This has been proven quite successful in entrepreneurial hubs like Silicon Valley, where 66% of the tech workers come from a foreign country (Jacobs, 2025). In addition, there is evidence that immigrants are both more likely to create impactful patents (Bernstein et al., 2022) and to start businesses (Chodavadia et al. 2025, Azoulay et al. 2022). However, in the current political climate, immigration rules, including those affecting expats, are generally being tightened rather than loosened, which might prevent skilled labor from moving to places where these skills are needed.

## 2.6 Market size

The final element we look into is the market size in the different countries, which provides an important source of demand for new products and services. As is clearly visible in Table 2.6, the internal market of especially China but also the US is significant and many times the size of the markets in other countries. Access to international markets can provide an alternative to a large home market, but as has been clearly visible in the last few years this does not provide a guaranteed alternative. Nevertheless, the trade facilitation index shows that these smaller countries also score higher on openness, which might help start-ups to reach markets abroad. The third indicator shows the population size of the different countries, which might be seen as an approximation of potential market size in terms of consumer demand. This clearly shows that China by far has the highest number of potential customers and still has potential to grow even more demand for their products once their income increases.

**Table 2.6:** Measures of market size across different countries

| | NL | US | UK | China | Singapore |
|---|---|---|---|---|---|
| GDP, PPP$ million (2024) | 1,533,376.2 | 29,298,013.0 | 4,352,486.5 | 38,190,083.3 | 909,690.2 |
| Trade facilitation index, 0 (worst) - 2 (best) | 1.9 | 1.8 | 1.8 | 1.61 | 1.85 |
| Population, thousands (2024) | 17,993.49 | 340,110.99 | 69,226.00 | 1,408,975.00 | 6,036.86 |

*Source: OECD (2025), World Bank (n.d.).*

The European Union also offers a large internal market with a combined GDP of $29,769,812 (i.e. comparable to the US). However, many barriers for trade between EU countries still exist, this mostly has to do with differences in regulations and administrative procedures, which can be complicated by the multiple levels of governance. It is therefore imperative to harmonize these rules as much as possible and minimize bureaucratic burdens for businesses, as also called for in the Letta report on the single market (Letta, 2024). While some barriers also exist in for example the US between different states, these are not comparable to the ones faced by businesses in the EU which also have to navigate language and cultural differences.

## 2.7 Conclusion

In this chapter we analyzed several important conditions for entrepreneurship and scaling businesses specifically. We saw that there are significant differences in the institutional background of countries, both in terms of formal institutions and regulations and more informal norms and values which shape the entrepreneurial culture. The liberal market economy of the US, with a low amount of regulation, provides a more fertile breeding ground especially in combination with a culture of risk-taking and high rewards for successful entrepreneurs. While the Asian countries have a very different model, we saw that once the government decides to invest in certain sectors, they receive a lot of support and regulatory leeway to innovate. The European context in contrast is heavily regulated and fragmented, which makes scaling more difficult.

On the side of resources, we looked into the available capital and talent, and the internal market start-ups can easily access. The capital available for start-ups is one of the key advantages of the US, with China closely following. While the human capital is relatively comparable, the large internal market start-ups can access in both China, and the US again provides an advantage for scaling up. We discussed various possible solutions, given the large institutional differences it is not recommendable to try to copy the Chinese or American model. Europe should instead invent its own type of entrepreneurial economy, which will likely heavily rely on European integration to broaden the accessible market and financial capital as well as government intervention to address some of the most pressing needs of start-ups such as the need for launching customers.

# 3 Scaling in the Netherlands

The previous chapter highlighted how the Dutch scaling landscape differs from that of other countries. Building on these insights, this chapter focuses specifically on the challenges that start-ups and scale-ups encounter within the Dutch context. Successfully scaling a company requires overcoming a range of barriers that can be grouped into two levels: ecosystem-level challenges and firm-level challenges.

Ecosystem-level challenges relate to the broader environment in which companies operate and include issues such as access to financing, talent availability and policies. On the firm-level, the challenges are more focused around internal pressure on resources, scaling skills and being technology push oriented instead of market pull oriented.

The findings presented in this chapter are based on a combination of interviews with entrepreneurs and other stakeholders in the innovation ecosystem and insights from relevant literature.

## 3.1 Ecosystem level

The challenges faced by deep tech companies are strongly influenced by the broader innovation ecosystem in which they operate. Ecosystem-related challenges refer to external factors that affect the ability of companies to develop, commercialize, and scale their innovations successfully. These challenges may arise from institutional structures, funding instruments, regulatory frameworks, market dynamics, or the availability of specialized networks and support mechanisms.

### 3.1.1 Financing

The search for appropriate financing emerged as the most frequently mentioned challenge in the interviews, and it was mentioned both by entrepreneurs and public stakeholders. The issue around financing is multi-faceted. While substantial public support is generally available during the first years of a start-up's development, the available funding instruments become more limited in later stages, precisely when capital requirements increase significantly. Mainly the larger funding rounds are hard to acquire in the Netherlands. At the same time, scale-ups often remain within a high-risk phase, while investors generally are risk averse, making it difficult to secure large volumes of patient capital. In the Netherlands, institutional investors with greater capital resources typically invest alongside private equity parties. These private co-investors, however, typically operate with return expectations that involve achieving substantial growth in value within a defined investment horizon. As a result, companies struggle to align their financing needs with investor requirements, which in several cases leads them to seek funding outside the Netherlands.

In the Scale-up Dashboard, that monitors the growth potential of Dutch businesses, it is mentioned that there is a 'missing middle' in the financing landscape. This refers to companies that have outgrown the funds provided by banks but are still too small to attract the big funds (ECE, 2025b). The observations from the interviews are consistent with broader findings: the limited number of large investment rounds in the Netherlands is seen as one of

the important factors behind the relatively low conversion of start-ups into scale-ups (Ministerie van Economische Zaken, 2025b).

### 3.1.2 Talent

Across all domains within the NXTGEN Hightech Growth Fund program, access to suitable talent represents another structural challenge for the interviewees. The availability of professionals with the specific technical expertise required by deep tech scale-ups is limited. For smaller companies, training candidates who do not fully meet these requirements are costly and resource-intensive. It was also mentioned that attracting talent from outside the Netherlands proved difficult, which further limits the access to suitable talent. At the same time, some scale-ups have adopted a broader perspective on recruitment to expand the potential talent pool, prioritizing adaptability, learning capacity, and problem-solving skills over domain-specific knowledge. Nevertheless, attracting and retaining talent remains challenging across the sector, partly because start-ups and scale-ups are often unable to offer the same level of stability and employment security as larger, established firms.

The Scale-up Dashboard identifies the access to good, qualified employees as one of the biggest bottlenecks for scale-ups. In addition, it highlights that scaling a company is not only a matter of increasing the workforce. As an organization grows, the need for onboarding, coordination, and management also increases. Sustainable growth therefore requires companies to adapt and redesign their organizational structures (ECE, 2025b). One explanation for the challenges associated with attracting and retaining (international) talent in the Netherlands is the relatively limited attractiveness of employee participation schemes. The Netherlands ranks 20$^{th}$ globally in terms of the attractiveness of stock option arrangements (Ministerie van Economische Zaken, 2025b). Employee participation schemes play an important role in enabling start-ups and scale-ups to attract talent despite limited financial resources. As companies grow, increases in share value can compensate for lower salaries and align employee incentives with company performance. Research also suggests that such arrangements can contribute positively to innovation and business (Halbertsma, 2026). The Netherlands performs relatively well on the overall attractiveness for (international) talent, where it ranks 8$^{th}$ globally (Ministerie van Economische Zaken, 2025b).

### 3.1.3 Facilities and infrastructure

Access to adequate test facilities also constitutes a recurring barrier for the interviewed stakeholders. For deep tech start-ups and scale-ups, testing and validation facilities are essential for product development. However, companies frequently encounter difficulties in identifying and accessing suitable infrastructure, partly due to limited capacity at specialized facilities and high costs. In addition, constraints within the Dutch electricity grid presented a significant bottleneck. Grid congestion limits the availability of new connections, making it difficult or in some cases impossible to operate testing environments or production facilities, thereby delaying further development and scaling activities.

The literature describes how deep tech start-ups need a lot of physical space. However, access to this space can be challenging, due to its limited availability in the Netherlands. This national picture masks significant regional differences, as several provinces still have available capacity while others are effectively fully occupied (SEO, 2025). For scale-ups it is important to have the proximity of infrastructure and testing facilities (Ministerie van Economische Zaken, 2025a). The '*Monitor Ondernemingsklimaat 2025*' specifically looked into the satisfaction with the dimension 'energy infrastructure', which was viewed unfavorably by a substantial share of respondents: 33% rated its availability as "(very) poor" (SEO, 2025).

The challenges associated with grid congestion in the Netherlands are only growing, which increasingly constrains companies seeking to obtain or expand electricity connections. The number of businesses waiting for a grid connection increased by 18% between 2024 and 2025, highlighting the worsening pressure on the electricity network (SEO, 2025). In addition, environmental regulations related to nitrogen emissions present a further obstacle for start-ups and scale-ups. Particularly in sectors with relatively high nitrogen emissions, these regulations can limit production capacity, delay permitting procedures, and restrict opportunities for expansion (SEO, 2025).

**LeydenJar (Energy domain)**
Originally, batteries use graphite in their anodes, but using silicon for anodes could improve the energy density. However, because silicon swells during lithiation, its use in batteries is challenging. LeydenJar developed a pure silicon anode that is both porous and flexible, mitigating the problematic swelling during lithiation. With the swelling issue eliminated, the full potential and capacity of silicon can be unleashed, and the same battery will be able to contain 70% more energy. This innovation will contribute positively to a solution for congested power grids. The material LeydenJar uses is also more sustainable than the standard used material graphite. Right now, their technology is suitable for consumer equipment, later it will also become available in the automotive sector.
LeydenJar started as a TNO spin-off in 2016. After developing a working prototype, the next step was to build machines that could produce the technology at scale. The current focus for scaling the company is to expand the amount of $m^2$ available for these machines, as this is essential to increase production and sales. This creates the need for new factories. After building the first one in Eindhoven, which can hold four machines, the next step is to construct a second factory that will be twenty times larger than the first one. The market for this company is large: every old-fashioned lithium battery existing right now can be replaced by the new technology. The company has multiple customers, from which one also made a large investment.

**Challenges and the factor speed**
The company faced three major challenges during its scale-up phase. For the first factory, 2 GW of electricity was required. However, at the last moment, the electricity permit was not granted, forcing the search for a completely new location. This process took a full year, causing a year-long delay in development while their 80–100 employees still had to be paid. Secondly, the timing and reliability of government subsidies proved problematic. Because of the long time it took before the money was on their account even after the subsidy was granted, in the end LeydenJar could not obtain the subsidy anymore as the company was operating at a loss at that time. Reason for that was the legislation about ‘onderneming in moeilijkheden’, which aims to prevent unfair state aid. For LeydenJar, this meant a loss of €5 million in subsidy and another year of delay. Lastly, timely communication from the government regarding decisions was often lacking.

During the start-up phase, close collaboration with TNO and universities provided easy access to testing facilities. Additionally, LeydenJar has not faced difficulties in attracting talent, as they do not focus on specific technical expertise but on open-minded individuals who are open to work with new technologies: a relatively large group to recruit from.

### 3.1.4 Regulations

Another challenge mentioned by interviewed start-ups and scale-ups is the complexity related to rules and administrative procedures. Subsidy application processes, in particular, are often perceived as complex, time-consuming, and resource-intensive. It is remarkable that this

challenge was mentioned more often by entrepreneurs than by public stakeholders interviewed. As the governance level increases, so does the experienced procedural complexity, which makes regional support schemes generally more accessible than national or European instruments. For smaller organizations, the administrative burden is high relative to their available capacity, reducing the time that can be allocated to core activities such as product development. In addition, state aid regulations, for example “onderneming in moeilijkheden”, may restrict access to certain support schemes for growing companies, creating an extra barrier. During the interviews, public stakeholders in particular highlighted challenges related to the limited long-term predictability of policy, and the perceived inconsistencies in current policy frameworks.

A big barrier mentioned in literature about going from start-up to scale-up is the regulatory burden in the field of labor and taxation (Ministerie van Economische Zaken, 2025b). More predictable policy frameworks, less fragmentation, and a stronger focus on the specific growth phases in which companies typically encounter bottlenecks are therefore seen as important enabling conditions. These factors are considered crucial for making sure that companies can grow sustainably (ECE, 2025b). Among all assessed dimensions in the ‘*Monitor Ondernemingsklimaat 2025’,* the predictability and stability of governmental policy received the lowest rating, with 56% of respondents evaluating it as “(very) poor” (SEO, 2025). This highlights the extent to which policy uncertainty is perceived as a barrier to business development and long-term investment decisions. The second-lowest scoring dimension was the quality of enabling legislation. Although this aspect was also viewed negatively by respondents, there was a considerable gap compared to the lowest-ranked dimension: 40% of participants rated facilitating legislation as “(very) poor” (ECE, 2025b). Nevertheless, these outcomes suggest that regulatory frameworks are an important area of concern within the Dutch business environment.

### 3.1.5 Culture

Another challenge identified for scale-ups in the Netherlands is related to cultural norms. From an early age, individuals are generally encouraged to conform to prevailing social standards and to avoid standing out. As a result, an orientation toward “thinking big” is less embedded in Dutch education and societal context. Attitudes toward failure further reinforce this dynamic. Within the Dutch context, failure is often associated with negative connotations and does not necessarily encourage repeated entrepreneurial attempts. In contrast, in ecosystems such as the United States, failure is more commonly perceived as a natural and valuable component of the entrepreneurial learning process. Overall, the prevailing cultural norms in the Netherlands appear to be relatively risk-averse, which may constrain the development and scaling of highly ambitious ventures.

RaboResearch examined the relationship between the start-up-to-scale-up conversion rate and two cultural dimensions: impulse control and long-term orientation. The analysis suggests that countries with higher levels of impulse control and a stronger long-term focus tend to achieve higher conversion rates from start-up to scale-up. In this comparison, the Netherlands scores relatively low on both dimensions compared to five other European countries, with only Sweden scoring lower (RaboResearch, 2026).

### 3.1.6 Market

Another challenge that was frequently mentioned in the interviews concerns market size and market readiness. For certain deep tech companies, the relevant market is still emerging or not yet fully developed, as is the case in areas such as green hydrogen. In these situations,

companies face a prolonged and uncertain period before large-scale adoption becomes feasible. The limited size of the domestic Dutch market represents an additional structural constraint. As a result, international expansion is often a prerequisite for growth. However, the fragmentation of Europe leads to trade barriers. This international expansion is complicated by differences in regulatory frameworks, standards, and national policies across European countries.

**VitalFluid (Agrifood domain)**
VitalFluid was founded in 2014 and develops innovative, easy-to-use technology that enables the on-site production of Plasma Activated Water (PAW) using only water, air, and electricity as inputs. PAW can be used to enhance crop growth without relying on conventional chemicals or leaving harmful residues. Following multiple successful trials, the technology has demonstrated its effectiveness in practice. At present, VitalFluid's primary market opportunities are located in the United States and the United Kingdom.

**Challenges and the factor speed**
The biggest challenge for VitalFluid lies in expanding the addressable market. Europe has the potential to become a major market for their technology, but regulatory barriers currently limit that opportunity. Existing European regulations are largely designed around stable chemical compounds, whereas the compounds generated through plasma are inherently less stable. While this does not make market approval impossible, it does mean that VitalFluid would be the first company to navigate a regulatory pathway for such a reactive application. The process is lengthy and even more costly. This resource-intensiveness is beyond the capacity of a start-up or scale-up to manage.

The speed at which scaling is possible, is a critical factor for VitalFluid, as competitors are gradually catching up. In particular, companies in China are developing similar innovations and may be able to bring lower-cost products to market more quickly due to less restrictive regulatory environments. This difference is even reinforced by the fact that VitalFluid's relatively small team must dedicate substantial time and resources to navigating European regulation, which limits the ability to focus on commercialization.

A first solution the company sees for the challenges mentioned can be creating more regulatory flexibility for innovation. For technologies like VitalFluid's, validation currently requires highly specialized and often expensive testing facilities, which makes large-scale testing difficult and financially burdensome. At the same time, existing regulations limit the ability to test directly with growers, even when such real-world trials would provide the most relevant evidence of effectiveness and safety.

According to VitalFluid, policymakers could introduce a temporary innovation pathway within the regulatory system. Such a route would allow promising technologies that do not fit neatly within existing frameworks to receive a conditional or time-limited approval for testing and validation. This would enable the company to generate evidence on safety, environmental impact, and practical performance before entering the full regulatory approval process. In addition, VitalFluid thinks that reconsidering the structure of initial regulatory and validation costs, so that these investments are shifted or reduced in the earliest stages. This would make the pathway more accessible and affordable for start-ups and scale-ups working on innovative, sustainability-driven technologies.

With the Netherlands being a relatively small country, the need to expand into non-domestic markets with different regulatory frameworks is not the only challenge. Literature also suggests that investors are more likely to invest in companies located in countries with larger

sales markets, which often correlate with a larger population size. An explanation for this is that start-ups operating within a single large market only need to comply once with quality, safety, and certification requirements. By contrast, start-ups expanding across a group of smaller countries may need to navigate multiple regulatory systems and institutions, increasing complexity, costs, and time to market (RaboResearch, 2026).

## 3.2 Firm level

In addition to ecosystem-related barriers, deep tech and high-tech companies face a range of internal organizational challenges. These firm-level challenges are linked to the capabilities, resources, and decision-making processes required to successfully transition from technological innovation to scalable business growth. The following challenges illustrate the internal barriers companies encounter throughout their growth and scaling trajectories.

### 3.2.1 From pilot to scalable product

A recurring challenge among deep tech companies mentioned in the interviews, is the transition from pilot projects to scalable products. Although pilots are often effective in demonstrating technical feasibility, they rarely provide sufficient evidence of commercial viability or readiness for large-scale deployment. Several interviewees highlighted that scaling requires capabilities that differ fundamentally from those needed during the research and development phase, including manufacturing expertise, supply chain coordination, and the capacity to deliver products at volume. Interviewed companies emphasized that a successful pilot does not necessarily imply that a product can be manufactured efficiently or scaled economically. In some cases, even limited production runs proved to be highly challenging. This situation creates a “capability gap”, in which companies are required to develop or acquire competencies beyond R&D while simultaneously operating under uncertainty regarding market adoption. To describe the different processes in product development the literature distinguishes between the technological readiness level (TRL) and the manufacturing readiness levels (e.g. DoD, 2025). While these can run similar to each other these processes do often not match completely and can create a wedge between the ability to produce a working prototype and the ability to produce a product at scale.

### 3.2.2 Revenue gap

Another challenge is the revenue gap that arises during the early commercialization phase, in which companies experience an extended period without substantial revenues while continuing to require considerable financial resources. This challenge is particularly pronounced in deep tech sectors, where firms must make substantial investments in product development, validation processes, and organizational capabilities well before stable revenue streams can be established. During this period, companies are required to manage scarce resources carefully while continuously securing additional funding to sustain operations and support growth. The uncertainty surrounding the timing and scale of future revenues may constrain growth trajectories and lead firms to postpone or scale back strategic activities. This phenomenon has often been referred to in literature as the ‘valley of death’ in the development of companies and is especially relevant for high-tech start-ups (Gbadegeshin et al., 2022).

**Sandgrain (Semicon domain)**
SandGrain provides a hardware-rooted cybersecurity solution called CyberRock, designed to secure connected devices throughout their entire lifecycle. Instead of relying solely on traditional certificate-based authentication, CyberRock uses a unique hardware identity embedded in each device, combined with a secure cloud platform for authentication, provisioning, encrypted communication, and trusted firmware updates. This approach enables scalable, low-maintenance security for industrial IoT environments while also supporting post-quantum resilience.

SandGrain's solution uses a symmetric authentication model, in which every device is equipped with a physically unique chip linked to a corresponding secure digital identity in the cloud. This allows organizations to verify with certainty that they are communicating with the intended device. By embedding secure-by-design principles into every IoT node, CyberRock not only strengthens protection against cyberattacks, but also supports traceability, lifecycle assurance, and compliance without adding unnecessary operational complexity.

**Challenges and the factor speed**
The question is not *whether* competitors will emerge, but more about *when* they will. The company's main advantage is its head start: it entered this space early and has had more time to develop and validate its technology. However, the more visible the company becomes, the more likely it is that other players will begin adapting to the underlying idea.

The fear that competitors with greater access to capital could catch up technologically is related to the challenges of finding customers and financing. As highlighted in the interview, securing the first customers is particularly difficult when offering a highly innovative technology. In the early stages, companies are often still focused on building the right capabilities, validating the solution, and preparing it for commercialization, rather than generating stable revenue. This creates a difficult funding gap: investors typically expect recurring revenue before committing to a Series A round, while recurring revenue itself is often impossible to achieve without first securing larger customers. Together, these dynamics can reinforce the perception that the European investment climate is still not sufficiently equipped to keep promising technology on the continent.
This makes speed of execution and market traction especially important. If larger international players, often with more access to significantly greater financial resources, decide to pursue similar solutions, SandGrain's current technological lead could narrow quickly. In that context, building scale, market presence, and strategic positioning early is essential to turning a temporary lead into a durable competitive advantage.

According to SandGrain, the dual-use nature of its cybersecurity technology creates opportunities to collaborate with the public sector before achieving full commercial traction. The company argues that paid pilot projects with organizations such as the Ministry of Defence could provide an opportunity to validate the technology in a real-world environment, demonstrate its reliability, engage relevant stakeholders, and gain access to testing environments that would otherwise be difficult or costly to obtain.
From SandGrain's perspective, such *proof-of-concept* projects could also reduce uncertainty for potential investors by providing early evidence of the technology's practical value. If successful, these collaborations may facilitate follow-up commercial partnerships and help bridge the revenue gap that many deep tech companies experience during the transition from technology development to market adoption. In this context, public-sector involvement can play a broader role in strengthening the ecosystem and helping promising technologies bridge the revenue gap by reducing commercial uncertainty during the transition from technology development to market adoption

### 3.2.3 Technology push versus market pull

The prevalence of a technology-push approach, in which development efforts are primarily driven by technological capabilities rather than validated market demand, is also a challenge in scaling-up. Particularly within deep tech start-ups, the initial emphasis is often placed on advancing and refining the technology itself, while comparatively less attention is given to customer needs, application contexts, and commercial feasibility. This approach can result in inefficiencies, including the development of solutions without a clearly defined market or a focus on sectors characterized by lengthy adoption cycles. In several cases, companies were required to revise their strategic direction after recognizing that the original application did not offer a sustainable path toward revenue generation or scalable growth.

Besides this being mentioned in the interviews, the innovation literature also shows that it is essential to combine both technological and commercial sources of innovation in order to develop the right economic outlet for the technology and thus a viable business model (Stefano et al., 2012).

### 3.2.4 Skills

This tendency toward technology-driven development may partly stem from the delayed involvement of individuals with managerial, entrepreneurial, and organizational skills. As previously noted, many start-ups originate from highly specialized technical teams. However, scaling a company requires competencies that extend beyond technology development alone. Notably, these challenges were mentioned predominantly by representatives from public organizations rather than by the entrepreneurs themselves. A recurring observation concerned the limited presence of serial entrepreneurs within start- and scale-ups, resulting in a relative lack of experience in business development, organizational leadership, and the capabilities required to successfully scale a company.

These leadership skills are considered so critical in the scaling phase that the Scale-up Dashboard argues for leadership development to be recognized as fundamental economic infrastructure, representing a broad investment in scaling capacity (ECE, 2025b). As companies grow, different leadership qualities and capabilities are required.

### 3.2.5 Inclusivity

A final challenge on firm-level that was mentioned during the interviews concerns the inclusivity of the entrepreneurial ecosystem. An interviewee indicated that female entrepreneurs and entrepreneurs with non-Dutch backgrounds continue to face structural barriers in accessing financing. According to this interview, implicit biases within the investment landscape may negatively influence funding decisions, despite research showing that these assumptions are often unfounded.

Compared to other countries, the Netherlands exhibits relatively high levels of gender inequality in the labor market, with a female-to-male ratio of 0.34, the lowest in Western Europe (ECE, 2025a). Although the proportion of women in scale-ups has remained relatively stable over time, research indicates that female-led firms more frequently report access to financing as a key constraint. This points to persistent inequalities in access to capital and growth opportunities (ECE, 2025b).

## 3.3 Conclusion

This chapter shows that successfully scaling deep tech companies in the Netherlands requires overcoming a range of challenges. The success of scaling is determined by the interaction between firm-level capabilities and the surrounding innovation ecosystem. Across both levels, speed emerges as a critical factor: prolonged funding processes, regulatory uncertainty, infrastructure constraints, and delayed market adoption all reduce the pace at which companies can commercialize and scale their innovations. As a result, competitors, often from countries with greater access to capital, larger markets, or more supportive regulatory environments, may catch up with Dutch-developed technologies and gain a competitive advantage. Addressing these challenges therefore requires both strong internal scaling capabilities and a supportive ecosystem that enables promising deep tech companies to grow rapidly enough to remain internationally competitive.

# 4 Conclusions and recommendations

In this report we investigated the process of scaling a technological start-up in different countries. Our specific aim was to identify factors that influence the speed of scaling a start-up. Speed is an essential factor to stay ahead of the competition, and several reports have raised concerns that Europe is lagging behind other powers like the US and China. We compared the context for scaling in these different settings by looking at their entrepreneurial ecosystems, in addition we explored the context of the Netherlands in depth with stakeholder interviews. Based on this we identified various factors that significantly impact the speed of scaling a business. We summarize this in the following section and will end by recommendations for the Netherlands to improve the environment and ultimately the speed of scaling a business.

## 4.1 Conclusions

### 4.1.1 Speed as strategic factor

Relatively little research explicitly addresses the speed of scaling, even though differences in the pace of progression between funding stages have major consequences for entrepreneurial outcomes. In technology-intensive sectors, where development windows are short and capital and talent are internationally mobile, delays in scaling can quickly reduce the chance that promising firms to become competitive scale-ups. Speed should therefore be understood and studied as a strategic factor that shapes both firm survival and the broader innovative capacity of an economy.

### 4.1.2 Lessons from the international benchmark

Differences in the speed of scaling are closely related to the characteristics of national entrepreneurial ecosystems. Countries such as the United States combine deep venture capital markets, large integrated domestic markets, a strong culture of entrepreneurial ambition, and a more streamlined regulatory environment. China and Singapore illustrate that more state-driven approaches can also contribute to faster scaling of companies, but only under specific conditions and with substantial supporting resources. These international comparisons indicate that the Dutch debate should not focus on whether the United States, China or Singapore organized the start-up and scale-up climate better or on copying foreign models directly, but rather on understanding the underlying ecosystem conditions that make faster scaling possible and which of these can realistically be strengthened in the Dutch context.

In Chapter 2/3 we investigated various of these ecosystem conditions in depth, such as capital, talent and regulations. Although each of these contribute to the speed of scaling, some of these can be more easily adjusted than others. For various of the more fundamental conditions, such as market size and access to capital, coordinated European action is necessary. For the Netherlands, conditions related to a culture of entrepreneurship and skills for entrepreneurship stood out as the ones that could be improved with national policy.

### 4.1.3 Ecosystem scaling challenges

The analysis of the Netherlands confirms that the Dutch scale-up challenge is not simply caused by a lack of promising start-ups, but also significantly by structural bottlenecks in the surrounding ecosystem. The most important constraints concern access to later-stage risk capital, the availability of specialized talent, access to testing and production facilities, and shortages in physical space and energy capacity. In addition, start-ups and scale-ups face complex rules, fragmented support instruments (such as subsidies), and heavy administrative burdens, which slow down decision-making and raise the cost of growth. In addition, the fragmented landscape with many different organizations supporting start-ups as well as the inconsistency in the policies surrounding innovation and entrepreneurship create uncertainty for entrepreneurs. These barriers are interconnected, meaning that progress on one dimension is unlikely to be sufficient if other parts of the ecosystem remain constrained. The pressure to act is being felt by the new government which has formulated several ambitions to improve these factors, but it is still unclear how much of the ambition will be realized and will provide an actual improvement over the current situation.

### 4.1.4 Firm-level scaling challenges

Scaling is not only constrained by the external environment, but also by the internal capabilities of firms. Start-ups that seek to scale must move from technological development to commercial execution, while often lacking experience in leadership, business development, manufacturing, and organizational growth. The transition from a successful pilot to a scalable business model is especially difficult in deep tech sectors, where long development cycles, uncertain demand, and delayed revenues create a prolonged period of vulnerability. This means that the speed of scaling depends not only on the availability of external resources, but also on whether firms can develop the managerial and organizational capacities required to turn technological potential into market traction.

### 4.1.5 Concluding remark

Overall, we conclude that accelerating the growth of Dutch technological start-ups into scale-ups is both an economic and a strategic priority. The Netherlands has many of the ingredients for entrepreneurial success but currently lacks the combination of ecosystem conditions and firm-level capabilities needed to translate innovative potential into rapid and sustained growth. Therefore, faster scaling cannot be achieved through investment alone, as different constraints interact to delay the speed of scaling. It requires a broader strengthening of the Dutch scale-up environment, including, talent, infrastructure, market access, regulation, and leadership capacity of the founders. In addition, Europe needs to act to address some of the more fundamental challenges surrounding access to capital and markets. Only by addressing these conditions in a coherent way can the Netherlands improve its ability to retain promising firms, create long-term economic value, and strengthen its position in strategic technologies.

## 4.2 Recommendations

This report indicates that faster scaling cannot be achieved through a single intervention. The Dutch scale-up challenge is systemic in nature and therefore requires a coherent policy mix that addresses both ecosystem-level bottlenecks and firm-level capabilities. In addition, interventions need to be tailored to the specific Dutch and European landscape. This leads to the following recommendations:

1. **Adopt a coordinated ecosystem approach**
   The international comparison and the analysis of the Dutch ecosystem both show that the speed of scaling depends on the interaction between capital, talent, infrastructure, regulation, and market access. Therefore we recommend to national policy makers and ecosystem orchestrators to develop a more coordinated scale-up strategy that explicitly targets these interdependencies. This means that interventions should be designed as part of a broader ecosystem approach. Ideally this strategy would also differentiate between actions at different levels of government (including European) and address the current fragmentation of actors and policy initiatives. The “Actie-agenda start-up & scale-upbeleid” which was presented last year (Tweede Kamer, 2025) and the update of this strategy that is currently underway provides a good opportunity for this.
2. **Strengthen scale-up finance for later stages**
   The findings show that access to later-stage risk capital remains one of the most important barriers to faster scaling in the Netherlands. Institutional investors and public investment institutions should therefore focus more strongly on the financing gap that arises after the early start-up phase, particularly for firms moving from validated technology to industrial scaling and commercial growth. This may require larger and more targeted public-private investment instruments, stronger participation of institutional investors, and specialized financing arrangements for deep tech firms with long development cycles. At the same time, public funding cannot simply replace private venture capital as private investors bring specific expertise with them. It should therefore aim to complement private financing where market failures are most visible (i.e. investments with the highest risk) and to involve private investors with the right expertise and networks to strategically support these companies. This can be done by participating in rounds that include a combination of public and private investors, which would alleviate the risk of the investment but still bring expertise on strategy and access to networks. Important steps are already being taken by the inauguration of the Scale-up Europe Fund and the plans for the NII. However these government investments cannot close the gap that is observed between European and American capital markets, therefore integration of the European capital market and funds of institutional investors provide important long-term solutions.
3. **Invest in talent, leadership, and scaling capabilities**
   Scaling is constrained not only by external bottlenecks but also by internal organizational capabilities, therefore it is important that education providers and scale-up support organizations focus more explicitly on the human side of scaling. This includes expanding the supply of specialized technical talent, improving the attractiveness of the Netherlands for international knowledge workers, and strengthening employee participation arrangements that help growing firms attract and retain staff. The Netherlands also faces a gap in terms of entrepreneurial skills of the general population, which could be addressed by entrepreneurial education as part of the regular education programmes. In addition, more attention should be given to leadership development, mentoring, and scale-up management support, especially for founders who are moving from research and development into commercialisation and organizational growth. Strengthening these capabilities can help firms move more quickly from pilot success to repeatable market expansion.
4. **Improve access to infrastructure and test facilities**
   For many technological start-ups and scale-ups, bottlenecks in physical infrastructure directly translate into delays in scaling. Therefore it is important to involve infrastructure providers and regional development agencies to give higher priority to access to test facilities, pilot environments, suitable production space, and energy connections. This is especially important for deep tech companies that depend on specialized equipment and physical validation before they can enter the market at scale. A more proactive infrastructure strategy could include shared testing facilities, targeted support for pilot and

demonstration environments, and stronger coordination between innovation policy, spatial planning, and grid capacity planning. This could also involve coordination on a European level as many of these facilities are too specific and expensive to be built by individual countries. Reducing these bottlenecks would help shorten the time between technological validation and commercial deployment.

5. **Stimulate smarter regulation and use public demand strategically**
   The report shows that regulatory complexity and fragmented procedures slow down innovation and absorb scarce firm capacity. The Dutch and European regulators and public procurement authorities should therefore work toward simpler, faster, and more predictable procedures for start-ups and scale-ups, especially in areas where existing rules are poorly aligned with emerging technologies. This may include lighter administrative requirements in early growth stages, more room for regulatory experimentation, and targeted exceptions or temporary pathways for firms that face barriers due to rules designed for mature companies. At the same time, public procurement can be used more strategically to help innovative firms validate technologies, build a customer base, and bridge the gap between pilot and market adoption. In this sense, governments are recommended to act not only as regulator and funder, but also as launching customer where appropriate.
6. **Strengthen ecosystem coordination and European market access**
   The current Dutch scale-up environment remains too fragmented. Start-ups and scale-ups often have to navigate a complex landscape of funds, support organizations, knowledge institutions, and regional or national instruments. More coordination by an independent orchestrator across these actors could reduce transaction costs and improve the speed with which firms find relevant support, this support should also be organized at the relevant spatial level and be streamlined as much as possible. In addition, new initiatives should not simply add institutions to the existing landscape but carefully consider how existing actors could implement these. Another coordination question concerns the European internal market. There has been several calls to unify this market more seriously as firms still encounter different regulations and requirements in every country. Uniting this market and thus increasing the available demand for scaling firms should be a European priority.
7. **Harmonise European capital market legislation to help start-ups and scale-ups grow across borders**
   The Netherlands is a small country so the European perspective is crucial for start-ups and scale-ups to acquire finanancial resources. To make start-up financing easier across the EU, legislation needs to be harmonised by European policymakers and capital market regulators so that capital can move freely, investors face fewer regulatory inconsistencies, and start-ups and scale-ups have access to funds under predictable, cross-border rules. The goal is to turn the EU into a single start-up and scale-up financing market. This can be done by building on the EU Start-up and Scale-up Strategy (European Commission: Directorate-General for Research and Innovation, 2026), which has one main objective: to make Europe the best place to start, grow, and retain a technology company. The strategy addresses the structural barriers that have hindered European start-ups for years: fragmented regulation, limited access to capital, slow market entry, talent shortages, and insufficient access to infrastructure. Significant steps are currently being taken with measures such as the Scale-up Europe Fund and the EU Inc. regulations for businesses.

Overall, we encourage stakeholders, from policy, academia and coorperate, and entrepreneurs to address these challenges together. Improving the speed of scaling in the Netherlands will require significant changes and investments as outlined above. Unfortunately there is no quick fix and increasing the amount of capital or copying procedures from other countries is unlikely to work. While the government is an important actor in the

entrepreneurial ecosystem, there is no leader of the ecosystem and improving it requires action from a coalition that contains a representation of the complete stakeholder landscape.

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# Appendix A
# Underlying data

The data used in this study mostly builds on the Entrepreneurial Ecosystem Diagnostics report of the OECD, which was published in 2025. This report combines data on various entrepreneurial ecosystem elements, ranging from finance to talent, for all OECD countries. This data is assembled from various sources such as the World Bank, Global Entrepreneurship Monitor and OECD monitors. For our report we use the value of the raw indicators, which is an average of the available years between 2020-2023. We do not include all elements, but only the elements which we consider illustrative for the international benchmark.

Since we also look at non-OECD countries, we combined the data of the OECD with data of the original sources whenever possible. This means for example that for the worldwide governance indicators of the World Bank we go to the original report to collect the data for China and Singapore. We do this for all original data sources whenever possible. For these indicators we always try to select the exact same years as the OECD report does, i.e. 2020-2023. When this is not available, we select a time window that is as close as possible (e.g. 2021-2024). When data is only collected every three or five years, we select the closest available data point.

As the OECD data also contains missing values, we also check the original sources for the OECD countries. When data is available for earlier years, we include this in the report with a clear reference to the year of the data. Even with this approach we were not able to fill all the indicators for all the countries.

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