Awti Advisory council for science, technology and innovation

A BETTER START

THE KEY TO GROWTH OF KNOWLEDGE-INTENSIVE START-UPS

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ISBN: 978-90-77005-86-6

A better start

The key to growth of knowledge-intensive start-ups

October 2020

Photography	Bas Kijzers Fotografie
Design	2D3D Design (layout), Kate Snow Design (illustrations)
Printing	Quantes
	October 2020
ISBN	978-90-77005-86-6

All publications may be downloaded free of charge from www.awti.nl.

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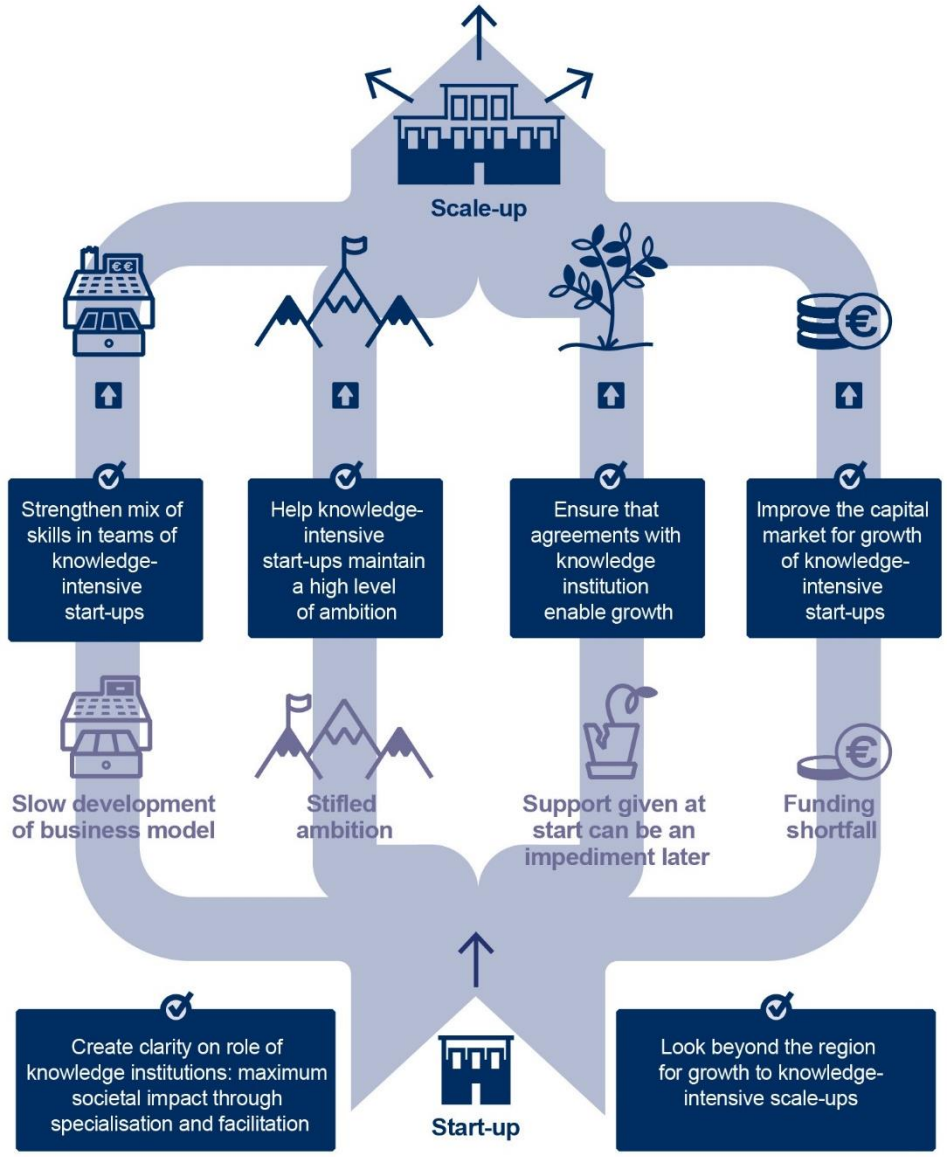

Summary

A good start is decisive in enabling knowledge-intensive start-ups to realise their growth potential. Growth is essential in allowing knowledge developed within Dutch knowledge institutions to be effectively used to resolve societal issues and boost the economy.

The climate for start-ups in the Netherlands has improved in recent years thanks to government policy which devotes attention to entrepreneurship and innovation. But the growth of knowledge-intensive start-ups after the initial phase falters, especially compared with other countries which also have a good basis of knowledge institutions.

There are several reasons for this. Knowledge-intensive start-ups are often slow to develop their business model; their level of ambition is limited; agreements made at the beginning can inhibit later growth; and they struggle to obtain adequate funding.

Several of these factors need to be addressed right from the start, with every party involved, including the knowledge institution or the company from which the start-up originates, increasing their focus on the start-up's growth from the beginning.

A good balance between 'knowledge' and 'entrepreneurship' within knowledge-intensive start-ups is crucial for their growth. Knowledge is the basis for the start-up, but entrepreneurship determines its success. Public and private financial backers of start-ups must make this balance a condition for providing funding and actively help start-ups to achieve it.

The agreements made between a start-up and 'its' knowledge institution must not be allowed to form a barrier to growth. A model agreement needs to be developed governing the use of intellectual property, which strikes a balance between the interests of both parties. Representatives of start-ups must be involved in the negotiations on this point. Knowledge institutions should not acquire voting shares in a start-up.

It needs to be made more attractive for entrepreneurs to grow the start-up. This requires an environment which incentivises knowledge-intensive start-ups to set and maintain a high level of ambition. It should be made more attractive (including from a tax perspective) to pay staff of start-ups (partly) in shares. This would provide a strong incentive for recruiting the talent needed to enable the start-up to grow.

Growth of knowledge-intensive start-ups takes place in a national and international context. Parliament and government therefore need to devote attention to developing a nurturing environment for scale-ups, which aligns with the often regional ecosystems in which start-ups are born. Regional support must not be allowed to form an obstacle to national or international growth.

There is also a need for more funding to be made available for growth, with investors who are tuned in to the specific situation of knowledge-intensive start-ups and scale-ups. The government can play a role here by making investing in knowledge-intensive start-ups and scale-ups more attractive through tax breaks and by taking the lead in setting up public-private funds to finance growth. Setting up such funds at EU level would increase the impact further.

Report

1

The Netherlands is missing opportunities because too few knowledge-intensive start-ups progress to become scale-ups

Too few knowledge-intensive start-ups progress to become scale-ups. That is concerning, because knowledge-intensive companies are crucial for the Dutch economy and for resolving societal problems. The lack of growth is striking, given the attention devoted in government policy to entrepreneurship and innovation. How can the growth of knowledge-intensive start-ups be improved?

Government policy has helped give the Netherlands a strong knowledge base and a fairly well-developed entrepreneurial ecosystem. Despite this, there are concerns that, when it comes to the growth of knowledge-intensive start-ups into scale-ups, the Netherlands is missing opportunities. The House of Representatives (‘*Tweede Kamer*’) of the Dutch parliament asked the Advisory Council for Science, Technology and Innovation (AWTI) to investigate what the possible impediments to that growth might be, and how they might be resolved.

1.1 Growth of knowledge-intensive start-ups is vital for society

Entrepreneurship is about ‘seeing and grasping opportunities’:[1] new, innovative businesses create value both for those directly involved and for wider society. Knowledge-intensive companies (see box for definitions) are a crucial part of this. By using knowledge which others do not possess in order to build a structural and competitive advantage,[2] these knowledge-intensive companies have the potential for great success. Dutch examples of this include Adyen, Acerta Pharma, Dezima Pharma and Bitfury. The potential and importance of knowledge-intensive, growing businesses for society is inestimable.

1. Shane (2004).
2. Agarwal & Shah (2013), Amit & Schoemaker (1993), Schumpeter (1934).

What are knowledge-intensive start-ups and scale-ups?

- In essence, **start-ups** are new businesses with growth ambitions. This means they are often still searching for their definitive business model.[3] Start-ups generally generate little or no turnover and are loss-making in the early stages. Once there is clarity about the product, market, revenue model and other components of the business model and the company begins to grow, the business leaves behind its status as a start-up.
- **Scale-ups**, or rapidly growing businesses, are businesses with three successive years of 20 percent growth (in turnover and/or employment), employing at least ten staff in the first of those three years.[4] In practice, this definition is sometimes applied more loosely to (rapidly) growing businesses in general. According to this definition, start-ups cannot immediately become scale-ups, because they must first grow to the point where they can employ 10 FTE and then continue to grow for a further three years.
- A (small) proportion of start-ups and scale-ups are **knowledge-intensive businesses**, for which knowledge forms the basis of their competitive advantage. They are businesses which engage in knowledge-intensive (innovative) activities to explore opportunities in varied and changing sectors and contexts.[5] The nature of the knowledge is diverse: it may be technological, academic, societal or practical, or a combination of these.
- Knowledge-intensive start-ups emerge where new, unique knowledge becomes available, for example in research institutes. A proportion of knowledge-intensive start-ups are based on knowledge developed within a university: these are referred to as academic **spin-offs**. If knowledge-intensive start-ups develop from existing businesses – for example because enterprising employees with knowledge that is untapped by their employer see and grasp opportunities outside their business – they are described as corporate **spin-outs**. Finally, there are knowledge-intensive start-ups which develop from the basis of different knowledge, such as user knowledge (user innovation). There is currently no separate term for this category.

Key contribution to society

Knowledge-intensive companies frequently explore opportunities that lie outside existing sectors and markets. Whilst this is not without risk, it can be successful and lead to the

3. Andries & Debackere (2007).
4. Audretsch (2012).
5. Malerba & McKelvey (2020).

emergence of entirely new sectors or domains.[6] This provides a breeding ground for new activity and contributes to the competitiveness of the Netherlands in a broad sense.

Deployment of new knowledge or technology can also help in successfully addressing major societal issues or delivering breakthroughs in resolving them. By developing innovative solutions, knowledge-intensive start-ups not only provide building blocks for solutions, but if they prove to work well, they can also rapidly scale up their operations and become knowledge-intensive scale-ups.[7]

Knowledge-intensive start-ups exploit knowledge developed elsewhere but which would otherwise not be put to use.[8] This is extremely valuable, because a great deal of new knowledge is developed in the Netherlands thanks to its strong universities, applied research institutes and other knowledge institutions. The voices urging that this knowledge be turned to the best possible advantage for society have become a clarion call.

Few start-ups achieve the growth needed to grasp opportunities

Doing business is however not without risk, and the number of knowledge-intensive companies, in particular, which fail to achieve great success outstrips the number that do. They are only of true value (to society) if they are able to grow and develop,[9] or, to use modern parlance, if they succeed in developing from start-ups to scale-ups (see box above for definitions). Only 5.6 percent of Dutch companies with more than 10 FTE achieve this growth spurt, and only a small number of them are knowledge-intensive.[10] Although founding and growing knowledge-intensive businesses will never be without risk, there is still a lot to be gained by boosting their success rate.

Example of a knowledge-intensive scale-up

In early 2020, the Dutch daily newspaper *NRC* interviewed the founder of the payments platform Adyen, Pieter van der Does. When asked whether he felt the €240 billion which now goes through the Adyen payment systems is a lot, he answered:

"If we were to open an office in India, we would still be a minor-league player. We've got to grow. If you see how many good people work here, and how disjointed the market around us is, it's essential that we become the natural choice for all retailers. And then 240 billion is very small beer."[11]

6. Aldrich & Fiol (1994).
7. Cf.: AWTI (2020b) on the role of science, technology and innovation in societal transitions.
8. Audretsch (2003), Acs et al. (2013).
9. NESTA (2009), VARIO (2018).
10. Jansen & Luxemburg (2019).
11. Hijink & Bronzwaer (2020).

Adyen is an example of a successful Dutch knowledge-intensive company. It was founded in 2006 and now has more than a thousand customers, employs 1,200 staff and has a stock market valuation of around €25 billion. Van der Does' ambition is clear: more growth.

1.2 Big improvement in start-up climate in the Netherlands

There has been a clear acceptance by both the Dutch government and public since the 1990s of the importance of entrepreneurship.[12] Numerous policy programmes and instruments have been developed focusing on starting and growing companies, and a number of key conditions for entrepreneurship have been improved.[13] Parliament has also played an important role here, among other things through proposed initiatives and tabled motions. This notable increase in attention for entrepreneurship has helped fuel an important development: at the start of this century only between 5 and 6 percent of working people in the Netherlands aged between 18 and 64 years were new or established entrepreneurs; that percentage has roughly doubled today.[14] The start-up ecosystem has also greatly improved.

More attention for start-ups

The rules for starting a new business have been simplified and tax incentives have been introduced, including the small business tax regime, the starters allowance and the self-employed allowance.

The innovation and business policy also includes start-ups (for example in the Top Sectors policy). There are a number of funding instruments, such as the Growth Facility Scheme, the Seed Capital Scheme and the Dutch Venture Initiative. The image of start-ups has also received attention, for example through the introduction of innovation and entrepreneurship prizes (such as the National Icons Prize).

The government Valorisation Programme, which ran from 2010 to 2018, was aimed at improving the regional ecosystem for entrepreneurship around knowledge institutions. The public-private initiative StartupDelta sought to improve the national parameters for start-ups (the 'national ecosystem') and to project an image of the Netherlands on the

12. Stam (2012), Kuipers & Wennekers (2008).
13. The Netherlands ranks fifth in Europe in the Global Entrepreneurship Index, after Switzerland, Denmark, the United Kingdom and Iceland), and eighth place worldwide. The Netherlands is also among the 'rapid risers'. See Ács et al. (2019).
14. According to data from the Global Entrepreneurship Monitor; see Bosma & Kelly (2019) and Reynolds et al. (2001).

international stage as a good breeding ground for start-ups. The creation of StartupDelta was a direct consequence of a motion tabled in parliament.[15]

The recent increase in attention for the growth and development of start-ups is exemplified by the creation of Techleap[16] (the successor to StartupDelta) and the national investment fund Invest-NL. This policy also incorporates many of the recommendations made in the 2014 AWT report 'Brilliant businesses' ('Briljante bedrijven').[17]

Attention for knowledge transfer has also increased

Not only are there more entrepreneurs in the Netherlands today, but knowledge transfer from educational and research institutes to entrepreneurs has also increased, among other things through (knowledge-intensive) start-ups. A great deal of effort has been invested in recent years in encouraging the creation of more start-ups from universities and other knowledge institutions.

The Netherlands has enormous potential for such knowledge transfer, having one of the strongest knowledge bases in the world, with first-class universities, universities of applied sciences and public research institutes.[18] The Netherlands is also among the world leaders in terms of citation impact, i.e. the relative number of citations of Dutch research in scientific publications.[19]

Partly thanks to the Valorisation Programme referred to earlier, knowledge institutions have become more aware of the need to promote start-ups as a way of applying their knowledge. Young Dutch researchers, especially, are also relatively keen to translate their research results into activities which deliver economic or societal value.[20]

The Netherlands is becoming an increasingly attractive start-up hub

Amsterdam-StartupDelta has in recent years been rising up the global rankings of the most attractive ecosystems for new (knowledge-intensive) business initiatives. It has risen

15. Kamerstukken II 2013-2014, 33 750 XIII, nr. 17 (motion tabled by MP Lucas), Tweede Kamer der Staten-Generaal (2013).
16. Techleap (2020a).
17. See AWT (2014). Among other things, the report recommended more attention for entrepreneurship in education, aligning start-ups with international missions, more growth acceleration programmes, and giving greater prominence to successful growth businesses.
18. Koens et al. (2018).
19. Articles by scientists working in the Netherlands are cited 1.39 times more often than the average in their field. Globally only Denmark scores higher, with a citation impact of 1.41. See European Commission (2020).
20. As an example, one of our respondents pointed out that 60% of the researchers at Oncode were involved in valorisation activities after just two years.

to 12th place in the 2020 list, with London and Stockholm the only European cities with a higher ranking.[21]

1.3 Too few start-ups develop into scale-ups

The Netherlands, then, is achieving ever greater success as a breeding ground for knowledge-intensive start-ups. Yet too few of these businesses evolve and grow into scale-ups.[22] Achieving this growth is not easy for start-ups, knowledge-intensive or otherwise. Businesses which do achieve sustained high growth over several consecutive years do so on the basis of a clear growth formula linked to a coherent business model and led by a balanced 'growth team'.[23] Knowledge-intensive companies account for only a small proportion (around 12 percent) of these successful growth businesses.[24]

Most scale-ups are not knowledge-intensive

The 'scale-up dashboard' developed by the Erasmus Centre for Entrepreneurship shows that most scale-ups are located in the retail, wholesale or business services sectors.[25] A study of scale-ups in Europe by Vlerick Business School also concludes that, despite their image as technological pioneers, most rapidly growing businesses are not active in the 'exciting' world of artificial intelligence or biotech. One in ten scale-ups is an IT business; the rest are in sectors such as logistics, recruitment, construction or consumer goods.[26] Whilst knowledge is undoubtedly also important in those sectors, it will in most cases not be the factor that makes the competitive difference.

Knowledge-intensive start-ups grow more slowly than other start-ups in the early years

Start-ups which start life in a knowledge institution or a company's R&D department grow their staff numbers less than other start-ups in the first five years following launch.[27] Their turnover also grows more slowly over the first five years than that of other start-ups.[28] Internationally, Dutch knowledge-intensive start-ups score lower than those in the best-performing countries, with employment growth outstripped in countries such as Germany,

21. Amsterdam-StartupDelta came 15th in 2019, and was 19th in 2018. See Gauthier et al. (2020).
22. See also Fikkers et al. (2015).
23. Jansen et al. (2020).
24. European Commission (2020) Figure 3.3-9 on p. 156.
25. Jansen & Luxemburg (2019).
26. Collewaert et al. (2020)
27. Appendix 2 and the background study carried out for AWTI by the Erasmus Centre for Entrepreneurship. See Erasmus Centre for Entrepeneurship (2020) pp. 20-21.
28. Erasmus Centre for Entrepeneurship (2020) pp. 22-23.

France or Switzerland, for example.[29] Dutch start-ups also generate lower turnover (revenue) on average than their peers in countries such as Belgium, Switzerland, France or Israel.[30]

The Netherlands is innovative, but limited growth of knowledge-intensive start-ups is a weakness

Although the Netherlands scores well in several innovation rankings, it does less well when it comes to growing knowledge-intensive companies.[31] The Netherlands comes in the highest segments in the Global Competitive Index (GCI) and the Global Innovation Index (GII), scoring fourth place in both rankings (in the 2019 editions).[32] The Netherlands is also classed as an 'innovation leader' in the European Innovation Scoreboard (EIS) 2020.[33] But the indicators on which the Netherlands does relatively less well are closely linked to the growth and development of knowledge-intensive start-ups.[34] Compared to the United States, the EU and the Netherlands have relatively far fewer knowledge-intensive scale-ups, with the number of tech scale-ups, for example[35] being just 1.3 per 100,000 inhabitants in the EU, compared with 7.0 in the US.[36] Israel and the United Kingdom also have more tech scale-ups than the Netherlands and the EU, in both absolute and relative terms.[37]

29. According to data from the European Startup Monitor 2016 (Kollmann e.a., 2016), the average jobs growth of Dutch start-ups from launch was four FTE, while in countries such as Switzerland, Germany, France or Switzerland, the figure was above 10 FTE. The figures in the European Startup Monitor 2018 contain less detail, and show average growth of Dutch start-ups to 11 FTE (probably because the sample contained more older start-ups), but this was still lower than for start-ups in countries such as France or Germany (17 FTE growth) (Steigertahl & Mauer, 2018).
30. European Startup Monitor 2016, Figure 49: at least a third of the surveyed start-ups in Israel, Switzerland, Belgium and Finland had annual revenue of more than €500,000; this was the case for only 15% of Dutch start-ups (Kollmann et al. 2016).
31. Techleap (2020a), p. 9.
32. For the GCI see: Schwab (2019) and for the GII: Dutta et al. (2019).
33. Hollanders et al. (2020).
34. The GII uses the indicator "Knowledge Impact", on which the Netherlands achieves 27th place worldwide; the indicator in the GCI is "Commercialization", (NL = 23rd place in the world), while the EIS the indicator is "Enterprise births >10 fte", with the Netherlands scoring 0.8%, lower than the EU average of 1.1%.
35. A 'tech scale-up' is defined here as: "a company operating in Tech & Digital industries, founded in the New Millennium, with at least one funding event since 2010 which has raised more than €1 million in funding," taken from the report by Mind the Bridge (2019) N.B.: biotech, life sciences, drugs and semiconductors were excluded in that study from the definition of 'tech scale-ups'.
36. European Commission (2020) Figure 3.3-10 p. 157, which again makes reference t to Mind the Bridge (2019).
37. European Commission (2020) Figure 3.3-11 p. 158: the Netherlands had 277 tech scale-ups compared with 2,217 in the United Kingdom and 1,159 in Israel.

Knowledge-intensive start-ups and scale-ups in the coronavirus crisis

The world was turned upside down in the spring of 2020 by the outbreak of the Covid-19 pandemic. It was followed by a crisis with an unprecedented impact on society, which was felt in virtually all sectors.[38] While it was too early at the time of writing this report to draw definitive conclusions, the expectation is that the crisis will also have a major impact on knowledge-intensive start-ups and scale-ups. At this juncture, however, that impact is still in its infancy, diffuse and uncertain.

The crisis has pushed many knowledge-intensive start-ups into a precarious situation. The absence of a proven revenue model already means that start-ups operate with very limited resources. Any delays to business development caused by the crisis could lead to shortfalls, and potentially to the collapse of the start-up. Such delays in finding a successful business model can easily occur because R&D activities have come to a halt or because of deferred discussions with clients. Delays can also arise in raising new external funding due to reticence on the part of investors in the face of increased uncertainty.[39] Many start-ups have seen their revenues reduce, with initial estimates suggesting that roughly half of start-ups and young tech companies have seen a significant reduction.[40] This is exacerbated by the fact that the initial support measures for businesses in response to the Covid crisis were unsuitable for start-ups, because they were based on an assumption of recurring revenue. A special scheme (bridging loan) was introduced specifically for start-ups later.[41]

At the same time, the crisis also offers opportunities in the short term for knowledge-intensive start-ups. Small businesses are relatively agile, and changes in consumption patterns give rise to new markets. The company Zoom Video Communications, which was launched in 2011 by a group including a former employee of Cisco, has doubled its revenues during the crisis.[42] Other IT companies, too, for example those active in remote working, digital marketing, cloud computing and online platforms, also stand to benefit from growing demand caused by the crisis.

Looking at the longer term, the effects are more uncertain. A great deal of research and development at knowledge institutions and in industry has run into delays as university campuses have closed and people have worked from home. The ‘reservoir’ of new knowledge is being less readily refilled and/or topped up during this period. The feeder system needed for the emergence of new knowledge-intensive start-ups is

38. CBS (2020), FME (2020).
39. See article at Sprout.nl (2020), Deloitte (2020).
40. Techleap.nl (2020b).
41. The COL scheme for Start-ups and Scale-ups. See Rijksoverheid.nl (2020).
42. Financieele Dagblad (2020).

consequently slowly drying up. The number of new businesses being created has already fallen significantly, and there is talk of a 'lost generation of new businesses', with a concomitant negative impact on jobs growth.[43] At the same time, the long-term consequences could offer opportunities for knowledge-intensive start-ups and scale-ups: a crisis such as a pandemic can kickstart the application of new technologies and spawn new economic activity.[44]

Whatever the future holds, the crisis will assuredly bring about major shifts in the economic structure of the Netherlands. Knowledge-intensive start-ups and scale-ups will play a pivotal role in this dynamic, and it is therefore very important precisely at this point in time to ensure that these companies encounter as few obstacles as possible to their development and growth.

1.4 Request for advice: How can the number of knowledge-intensive scale-ups be increased?

AWTI believes the Netherlands should strive for a leading world position for the growth of knowledge-intensive start-ups. Observing that although more and more knowledge-intensive start-ups are getting off the ground in the Netherlands, their progress then stalls and very few of them go on to grow into companies which provide relevant additional employment, the House of Representatives of the Dutch parliament asked AWTI what (typically Dutch) barriers or impediments stand in the way of this growth and how these can be removed.[45]

In response to parliament's request for advice, the central question addressed by AWTI in this report is as follows:

How can obstacles be removed to enable more (knowledge-intensive) start-ups to grow into viable businesses which also deliver more employment?

Approach

To answer this question, we first analysed what lies at the basis of the current situation, following the lines of two subsidiary questions from parliament:

- What barriers impede the growth of knowledge-intensive start-ups?
- What (typically Dutch) characteristics might be the cause of this?

43. Karimov & Konings (2020).
44. Carlsson-Szlezak et al. (2020).
45. Kamerstukken II 2019-2020, 31288, nr. 789, Tweede Kamer der Staten-Generaal (2020b), see Appendix 1 for the official request for advice.

These questions are addressed in chapter 2.

To analyse the development of knowledge-intensive start-ups in the Netherlands, AWTI commissioned an external study from the Erasmus Centre for Entrepreneurship (ECE).[46] That study, published simultaneously with this report, incorporated quantitative and qualitative analyses of the performance of knowledge-intensive companies and how that relates to (the quality of) the ecosystem. As part of the study, ECE also held in-depth interviews with 13 individuals; brief background information on the interviewees is presented in Appendix 4. The study also included a comparison with other countries. The main findings of the ECE report are summarised in Appendix 2.

In addition, AWTI itself also carried out a literature review, drawing on numerous scientific and professional publications, datasets and international quantitative comparisons. These sources were supplemented and fleshed out in interviews conducted by AWTI with scientists, entrepreneurs and policymakers (see list of interviewees in Appendix 4).

These analyses form the basis of the response to the final subsidiary question from parliament, namely how the situation surrounding knowledge-intensive start-ups can be improved:

- What measures can be taken to stimulate the growth of knowledge-intensive start-ups?

The recommendations for improving that growth are set out in Chapter 3.

Project group and reviewers

This report was prepared by a project group consisting of Council members Jos Benschop (chairman), Sjoukje Heimovaara and Ellen Moors, and staff members Hamilcar Knops (secretary), Chris Eveleens, Nora van Bracht and Eva Rouwmaat.

In the final phase of the preparation of this report, a draft was submitted to two external reviewers (see Appendix 3), who were asked to reflect on the consistency of the draft and identify any gaps. The reviewers' comments were then incorporated under the responsibility of the Council.

46. Erasmus Centre for Entrepeneurship (2020).

2

Advice: Create an environment that feeds ambitions, strengthens competencies and offers appropriate funding

Knowledge-intensive start-ups need more patience and support to help them grow than other new businesses. An environment is needed which helps strengthen the entrepreneurial skills present within knowledge-intensive start-ups and keeps the level of ambition high. It is also key that agreements made by a start-up with a knowledge institution at the beginning do not inhibit its growth later. There is also a need for more funding to enable the development of knowledge-intensive scale-ups, with the right investors for the specific situation in which knowledge-intensive start-ups operate.

Knowledge-intensive start-ups do not thrive well enough in the existing business climate to enable them to grow into scale-ups. Their growth stalls (see §1.3), which means they are unable to realise their full potential. Additionally, start-ups seeking to bring a new invention or new knowledge to the market need more time, talent and patient venture capital than other start-ups. AWTI recommends that they be better supported in their growth, given their potentially great value for society.

This chapter describes the main obstacles impeding the growth of knowledge-intensive start-ups to become scale-ups. These start-ups often find it difficult to build a team with the right mix of expertise, with entrepreneurial knowledge and experience often being a weak point (§2.1). Start-ups also often moderate their original high ambitions as time goes by (§2.2). Choices made in the start-up phase can sometimes also put a brake on further growth (§2.3). A further problem in the Netherlands is the availability and ‘quality’ of funding to finance the growth to knowledge-intensive scale-ups (§2.4). Current policy does not address these problems adequately (§2.5).

The main problems impeding the growth from knowledge-intensive start-up to knowledge-intensive scale-up are shown diagrammatically in Figure 1. These impediments are discussed and examined in more detail in the following sections.

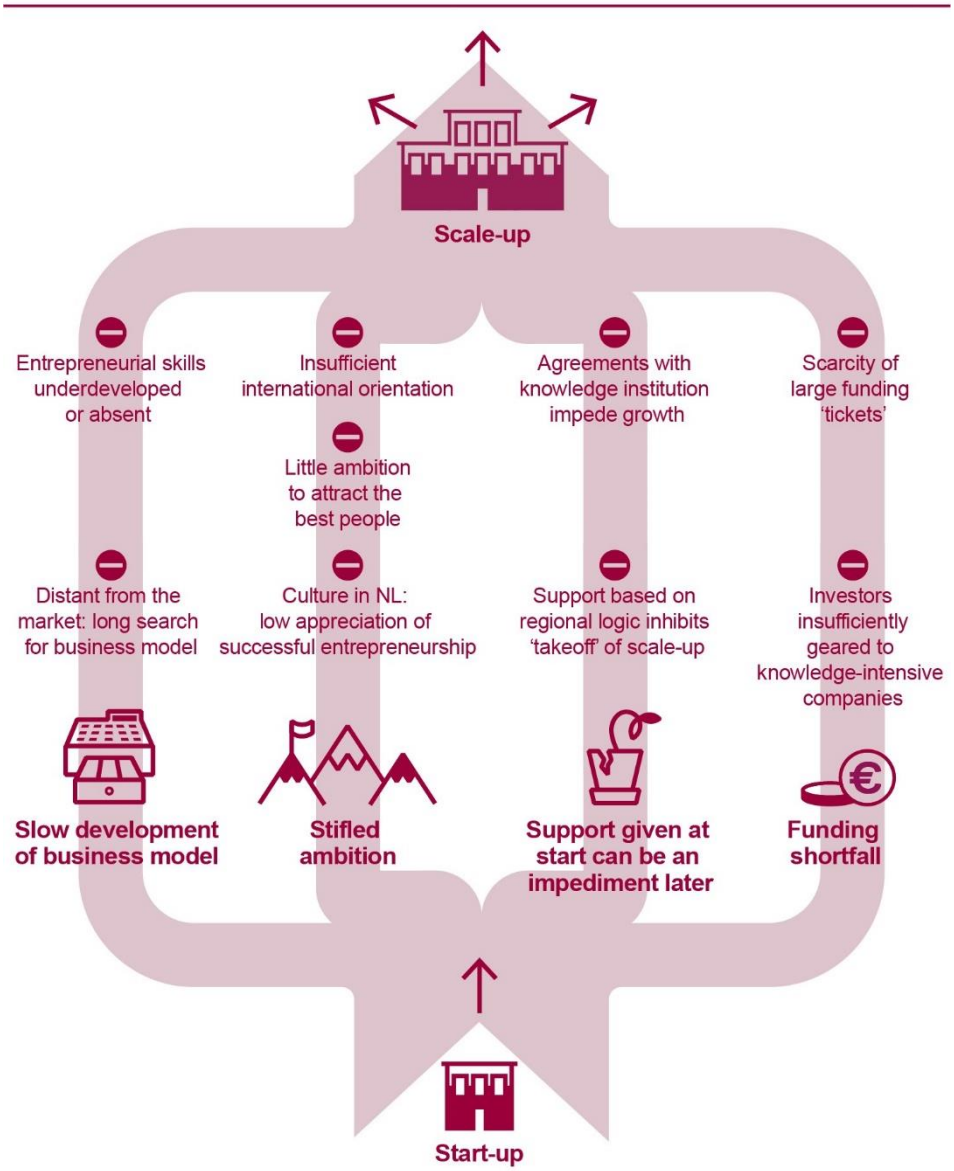

Figure 1. The main factors impeding the growth of knowledge-intensive start-ups to become scale-ups

2.1 Knowledge-intensive start-ups need more time to find the right business model

Knowledge-intensive companies start from the 'knowledge side'. Breakthroughs in knowledge have the potential to develop something genuinely new, but this does not happen by itself. It requires a complex and uncertain process of innovation, identifying the precise needs of customers and building the business. This in turn requires a mix of different competencies, with entrepreneurial skills being an important ingredient. It is therefore vital for growth and upscaling that the 'commercial side' is also in order.

Entrepreneurial skills too often underdeveloped or absent

In practice, experience with running a business and knowledge of the market often prove to be weak points for knowledge-intensive start-ups.[47] These start-ups are generally founded and initially run by people who have great strength in developing new knowledge based on their academic/technical skills. What is often lacking is the commercial knowledge and experience: knowledge of markets, skills needed to penetrate those markets, knowledge of corporate finance or management skills. This works to the disadvantage of knowledge-intensive start-ups, and especially those with an academic origin: their commercial credibility is often seen as a problem by (potential) financial backers.[48]

Attempts have been made in recent years to improve the entrepreneurial skills of knowledge-intensive start-ups, for example by offering students more entrepreneurial training, and through targeted training of researchers who (would like to) launch a start-up. Technology Transfer Offices (TTOs) at knowledge institutions and incubators have also contributed to strengthening these entrepreneurial skills.[49]

But that is not enough. The best chance of successful growth for a start-up lies in having a diverse management team, which combines both technical and commercial knowledge and experience. Start-ups which have such a strong team in place, with complementary competencies on board from the start, are also often able to raise more funds, in turn enabling them to recruit additional expertise rapidly and to hold on more firmly to their original lofty ambitions.

In practice, however, not all start-ups succeed in bringing together a mixed team such as this and to step aside if necessary. The example of LRD (Leuven Research &

47. See e.g. the Technopolis research carried out for the Dutch Ministry of Education, Culture and Science (Fikkers et al. (2015)) and Van Weele et al. (2017).
48. Erasmus Centre for Entrepeneurship (2020), p. 28.
49. Eveleens (2019).

Development, see §3.1) in Belgium shows that a professional and 'solid' supporter can play a useful role in installing such a diverse team within a start-up from the beginning. In the Netherlands, knowledge-intensive start-ups are still often set up initially on a 'minimal' basis, with too much reliance being placed on the researchers being able to take on the entrepreneurial activities themselves.[50] That inhibits the chance of growth.

Finding the right business model is often a lengthy learning process

Knowledge-intensive start-ups have a further handicap: whilst they rely on advanced knowledge and/or technology which is potentially very valuable, turning that into commercial success frequently requires a lengthy process of testing and evaluation. It takes some time to hit on a successful business model. As part of the development of the technology, an entrepreneur must also continuously gauge which sector or user(s) are the most appropriate target group for the technology: for example: is a new coating technology of greater value in the shipping industry or for use in wind turbines? The path from invention to innovation is a long one, and the learning process in finding a successful business model is generally more difficult for knowledge-intensive start-ups than for other start-ups; their starting point (new knowledge) is often a long way from the commercial market. This slower development is also confirmed in the research that AWTI commissioned for this report.[51]

This characteristic of knowledge-intensive start-ups has two consequences. First, it underlines yet again how important it is to have a balanced mix of skills and experience in the start-up, with sufficient attention for the entrepreneurial skills which help speed up the progress from invention to successful business model. If the start-up does not succeed straightaway in building a team that combines strong experience with entrepreneurship, it can be a great help if it is adequately supported and challenged from the beginning on the aspect of entrepreneurship.

Second, it means that if investors and financial backers do not make allowance for this difference in (speed of) development of knowledge-intensive start-ups compared with other start-ups, this can have a negative impact on the chances of raising the necessary finance. Compared with other start-ups launched at the same time, they lag behind in their performance and growth. Knowledge-intensive start-ups could benefit from (investment) funds that are focusing specifically on this type of start-ups. In some other countries quite a number of such funds exist, sometimes even focusing only on specific sectors, such as life sciences. That is, however, currently much less the case in the Netherlands.

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50. See e.g. Erasmus Centre for Entrepeneurship (2020).
51. Erasmus Centre for Entrepeneurship (2020), pp. 20-24, see also section 2.1.

It is thus of the greatest importance that investors understand that they need to have more patience with knowledge-intensive start-ups. If investors do make the right judgement call on knowledge-intensive start-ups, they can in turn use their knowledge, experience and networks to strengthen the start-up team.

2.2 The growth ambition quickly evaporates

Being based on new knowledge and/or technology means that knowledge-intensive start-ups often have considerable potential. The long and uncertain route which (hopefully) leads to exploitation of that potential requires a high level of ambition, which must moreover be sustained over a long period. Only then will the start-up retain sufficient drive to remain focused on growth and expansion and overcome obstacles. Yet in practice the initially high ambitions of many knowledge-intensive start-ups become diluted as time passes,[52] a contributory factor in limiting their growth. Although such a knowledge-intensive start-up may survive, for example as a technical consultant or minor niche-player, the potential which heralded its launch remains largely untapped, with missed opportunities as the result.

It is not easy to maintain ambitions at a consistently high level. Below we discuss a few factors which can cause those ambitions to weaken.

Start-ups often focus initially on the domestic market

It is striking how often Dutch (knowledge-intensive) start-ups focus on the domestic market; while in percentage terms they do this to a comparable degree to their peers in countries such as Germany or France, their domestic markets are much bigger.[53] To grow into scale-ups, Dutch start-ups need to lose no time in looking beyond the national borders. The early phase is precisely when businesses make many fundamental choices; if they base those choices on the Dutch market, it is much more difficult to broaden their focus to the international market later, for example because the developed product works within the technical and other standards applying in the Netherlands but is not yet aligned with standards elsewhere (within or outside the EU). This acts as a barrier to upscaling. Entrepreneurs in growing start-ups themselves describe ‘internationalisation’ as a very major challenge to the growth of their knowledge-intensive start-up.[54]

52. Several of our interviewees made this point; see also Fikkers et al. (2015), p. 12.
53. See the European Startup Monitor by Kollmann et al. (2016) and the Science, Research and Innovation Performance report by the European Commission (2020), in which Amsterdam-StartupDelta, despite its high ranking, scores relatively poorly on ‘Market Reach’. This point was also made repeatedly during our interviews.
54. According to an analysis by McKinsey & Company for Techleap (2020a).

Start-ups show little ambition to attract the best people

The first people recruited by a new business have the biggest influence on its development. Only by attracting the very best people ('A-people') from the beginning can a business be assured of vigorous development. However, Dutch start-ups, including knowledge-intensive businesses, often select people from their existing setting. This quickly leads to an approach in which 'good enough' becomes the norm and in which the key mix of commercial or business expertise and technical knowledge (see §2.1) is lacking, because the emphasis is on the technical orientation of the founders and their known network. Starting entrepreneurs by no means always display the ambition to be 'the best' in their chosen field and thus to go in search of the most suitable candidates, if necessary recruiting from abroad. Such an approach may not be the easiest path, but it does increase the chances of successful growth and development.

Relatively low appreciation of successful entrepreneurship in the Netherlands…

The culture in the Netherlands does little to encourage knowledge-intensive start-ups to maintain a high level of ambition. While many people in the Netherlands see entrepreneurship as a good career choice, the appreciation of 'successful entrepreneurship' is somewhat lower. The Netherlands is something of an international outlier here: 'successful entrepreneurship' is actually ranked higher than (normal) entrepreneurship as a career choice in other countries (see Figure 2).[55] Whilst this cultural phenomenon means that Dutch society encourages people to start a business, there is less enthusiasm for turning that business into a great success. The result is that if the high level of ambition and the ambitious growth strategy with which a knowledge-intensive start-up begins reduces over time, this is not really seen as a problem in society.

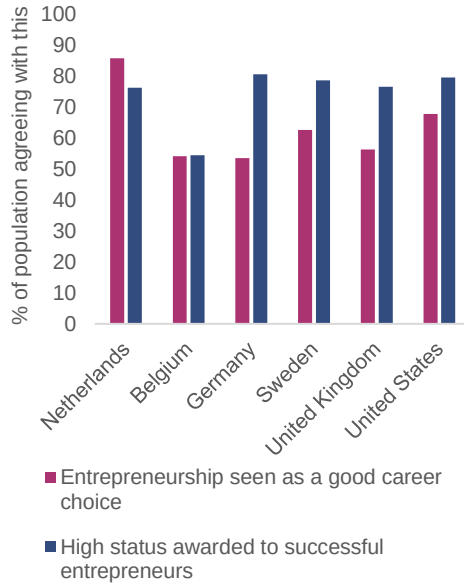

Figure 2. Appreciation of entrepreneurship and successful entrepreneurship

55. The figures are from 2019 and are based on the Global Entrepreneurship Monitor. See Bosma & Kelley (2019); cf.: Fikkers et al. (2015).

...and the lessons from unsuccessful entrepreneurship are also not valued

The unique lessons learned by entrepreneurs whose business fails are undervalued in the Netherlands, especially compared with other countries. Going through bankruptcy still carries a stigma in the Netherlands, unlike in countries such as the United Kingdom or Sweden.[56] This makes it hard for entrepreneurs who have failed once in the Netherlands to get a second chance (see Figure 3). That is a pity, because precisely through the failure of their (earlier) business, the entrepreneurs concerned have learned unique and powerful lessons, which can be of great value in a subsequent attempt to launch a start-up.[57]

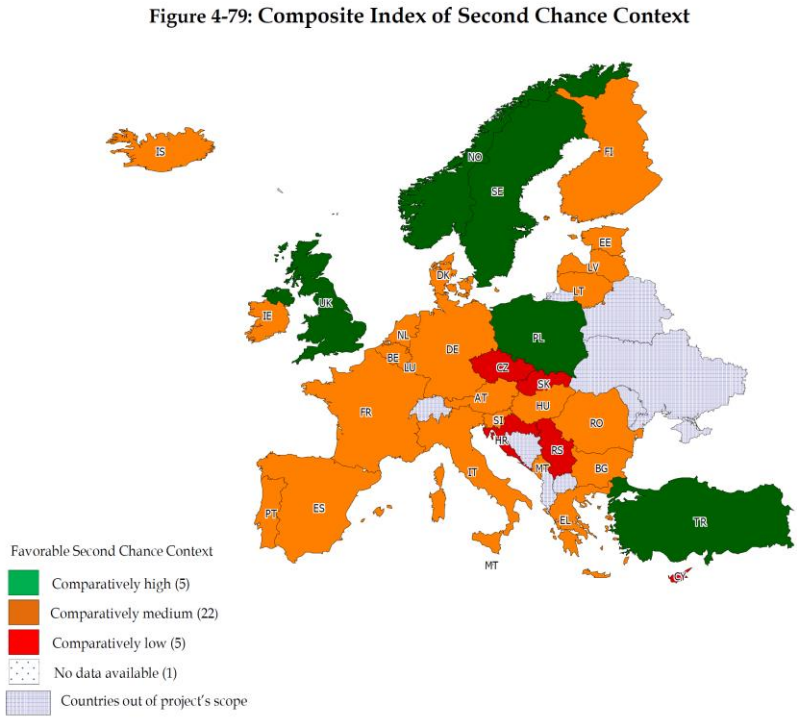

Figure 3. The 'second chance context' for entrepreneurs in the Netherlands is not optimum (2011)[58] (green = high support for second chance)

56. Burchell & Hughes (2007). See also Eurobarometer No 298 'Entrepreneurship' by The Gallup Organization (2010). N.B.: although these figures are somewhat dated, the fluctuations in these cultural characteristics are often limited.
57. See the research by Cope (2011) and Fang He et al. (2018).
58. From a report for the European Commission, DG Enterprise and Industry, by Calogirou et al. (2010) p. 61.

2.3 Support given at the start can be an impediment later

All kinds of choices are made in the early phase of a start-up which later have an influence on the chances of further growth. An example is the shareholder structure of the start-up, or the agreements made by knowledge-intensive start-ups regarding the use of knowledge (intellectual property agreements).

A proportion of knowledge-intensive start-ups are spawned by a 'parent institution' such as a knowledge institution or a company's R&D department. These start-ups almost always retain a number of ties with that parent institution, for example through agreements on the use of knowledge, or financial ties, for example in the form of a loan or shareholder arrangement. Knowledge-intensive start-ups also receive other forms of support in the early phase from the 'start-up ecosystem' within which they are born. It is known from the literature that appropriate support from the parent institution can get start-ups off to a good start. However, it is also the case that the start-up and the parent institution can sometimes have opposing interests, for example regarding the use of knowledge. AWTI asked start-ups and other stakeholders what the net effect of the early-phase support is in the Dutch situation, focusing particularly on knowledge-intensive start-ups which develop from knowledge institutions.[59] Start-ups originating in larger companies also have to make agreements with the parent company, but our interviews suggested that this is less problematic, possibly because both the parent and subsidiary – the start-up – are *businesses*.

Start-ups certainly receive help…

Among knowledge institutions, most universities have Knowledge Transfer Offices (KTOs) or Technology Transfer Offices (TTOs) to promote the 'valorisation' (commercialisation) of their knowledge. These offices are much less common at universities of applied sciences, each of which have their own structures to promote knowledge transfer and commercialisation.

As part of their mission, KTOs and TTOs provide support and guidance in the establishment of start-ups. Our research – in the Dutch context – revealed wide variation in the appreciation of the role of KTOs/TTOs.[60] There were positive reactions regarding the support they currently provide to start-ups, including in their quest for early-phase funding, and some start-ups also said they had benefited from the network of the

59. Erasmus Centre for Entrepeneurship (2020), see also Appendix 2 for a summary. The majority are KTOs/TTOs at universities, but at least one is an organisation for applied research; see also Appendix 4 for the ECE interviewees.
60. Erasmus Centre for Entrepeneurship (2020), pp. 27-28.

knowledge institution, especially in recruiting talent and sometimes in establishing links with relevant companies.

… but knowledge institutions sometimes impede further growth

By contrast, some respondents in the study we commissioned from the Erasmus Centre for Entrepreneurship expressed fairly negative views about the relationship between knowledge-intensive start-ups and KTOs/TTOs. Their experience is that it is often difficult to break free of the parent institution in a later phase. Some respondents also felt that KTOs/TTOs are mainly concerned about the interests of the knowledge institution (university) and less about those of the start-ups.[61]

Knowledge institutions such as universities or organisations for applied research engage actively in the start-ups that are founded on the basis of their knowledge, both through intellectual property agreements and by becoming shareholders. Intellectual property agreements stem from the fact that the knowledge was originally developed by the knowledge institution. By making agreements about the use of that knowledge, and possibly also by taking a stake as a shareholder, the knowledge institution can subsequently monitor or influence the use of that knowledge. An additional effect is that – if a lot of money is eventually earned with knowledge developed at the knowledge institution – a proportion of the profits flow back to the knowledge institution.

One of the tasks of KTOs/TTOs is to take care of the financial relationships and agreements around intellectual property, but our respondents were critical on this aspect. Ultimately, the interests of the knowledge institution and those of the start-up are different. This sometimes leads to conflicts, with a negative impact on the (further) growth of the start-up. Similar criticisms also emerged in the study carried out by ECE for AWTI regarding the role of KTOs/TTOs in relation to the growth of knowledge-intensive start-ups. Techleap made the same observation: *"current IP practices are the number one reason limiting growth and market investment for a significant number of spin-offs."*[62] The caveat should be made here that KTOs and TTOs in the Netherlands are still under development, and some of the experiences noted in the ECE study go back several years. Other interviews that we conducted for this report referred to (foreign) examples of large, professional TTOs which have a reputation for making a useful contribution to the growth opportunities of start-ups.

61. Erasmus Centre for Entrepeneurship (2020), p. 28. In an earlier study carried out for the Dutch Ministry of Education, Culture and Science, Technopolis reached the same conclusion (Fikkers et al. (2015), p. 14).
62. Techleap (2020a), p. 23.

Shareholdership and finance: the knowledge institution as a ball and chain

The support of a knowledge institution in the creation of a start-up can sometimes culminate in the knowledge institution becoming a co-funder or shareholder of the start-up.[63] At first sight, this helps the start-up and enables the knowledge institution to benefit if the start-up is successful. In practice, however, there are also disadvantages. The interests of the start-up and the parent institution are not parallel, creating a source of friction. Moreover, new financiers or investors are readily inclined to see a knowledge institution – for example a university – as a sluggish and passive shareholder, putting them off investing. A knowledge institution can thus also act as a drag on the growth of the start-up. The situation is different if the knowledge institution (or its TTO) has a strong reputation in establishing start-ups and facilitating their growth, without standing in the way of subsequent investors. A reputation such as this does however take time to build.

Finally, in practice start-ups derive little benefit from the university network in their search for the finance needed for the next phase (the growth phase) in their development.[64]

Interests of start-ups and knowledge institution do not run parallel as regards intellectual property

A discovery, invention or other form of new knowledge is very often the starting point for the founding of a knowledge-intensive start-up. The invention or knowledge can be protected through intellectual property rights. If it has been developed by a knowledge institution, it can enable the start-up to apply and profit from the discovery, invention or knowledge, for example by giving the start-up a licence to use it. The start-up may also itself acquire or be given the intellectual property rights.

The ability to use the protected new discovery or knowledge is an important element in supporting the value and growth potential of the start-up. If the agreements on intellectual property mainly serve the interests of the knowledge institution, this can in practice present a formidable obstacle to the development of the new business. This tension occurs regularly in practice.[65] This calls for clearer (standard) agreements on intellectual property, which strike a good balance between healthy growth opportunities for the start-

63. In 2018 the Association of Universities in the Netherlands (VSNU), the Netherlands Federation of University Medical Centres (NFU), the Royal Netherlands Academy of Arts and Sciences (KNAW), the Netherlands Cancer Institute (NKI) and the Netherlands Organisation for Scientific Research (NWO) published a guide on dealing with shareholdings by knowledge institutions and employees in academic start-ups *('Richtsnoer omgang met aandelenbelangen van kennisinstellingen en medewerkers in academische start-ups')*. It is more an outline of the context and the possibilities than a clear policy rule; the guide itself calls it setting out the 'contours of [the] policy'. See Schoots et al (2018, p. 3).
64. Erasmus Centre for Entrepeneurship (2020), p. 29-30.
65. Several of our interviewees gave examples of this.

up and the ability of the knowledge institution to share in the profits in the event of successful commercialisation of the discovery or knowledge.

Although (academic) knowledge institutions in the Netherlands did formulate a 'guideline' a few years ago on dealing with intellectual property rights in relation to start-ups,[66] the list of authors creates the impression that this document was drafted mainly by these institutions themselves rather than being the result of a 'negotiation' between knowledge institutions and (representatives of) start-ups. Neither does the guideline, while it provides a summary of possibilities and relevant considerations, propose a clear 'standard model'. Each case has to be considered separately and, if the start-up has limited insight into the topic of intellectual property rights, it will be put at a disadvantage. The guideline has evidently not led to a more uniform system for dealing with IP which promotes growth.

The above guideline focuses on employees of knowledge institutions who wish to begin exploiting intellectual property through a start-up. If students come up with their own invention, the situation is different: in the absence of other arrangements, they themselves own the intellectual property rights. Knowledge institutions deal with this in different ways. Some make students transfer any intellectual property rights to the university in advance.[67] Critical questions have been raised about this practice, including in parliament, based on fears that it could hold back enterprising students.[68]

(Initial) support from the region can also become a problem

Attention has also been growing steadily at regional level in recent years for stimulating new economic activity and the regional economy. Provincial authorities, metropolitan districts and regional development agencies, in particular, are playing a prominent role here. Knowledge-intensive start-ups are among those to reap the benefits of this.

However, this support does not always have a positive impact on the growth of start-ups. When regional parties invest, they often impose demands on the place of establishment, to ensure that the benefits accrue to the region as far as possible. However, scale-ups rapidly expand beyond regional boundaries, because as they grow they (need to) adopt a more national or international orientation. Not only has their market become much bigger, but the labour market which they tap into goes beyond the regional level, as does the funding market. That can be problematic.[69]

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66. On behalf of VSNU, NFU, KNAW and NWO by De Nooijer et al. (2016).
67. See NOS report 'Ruzie met de universiteit over een briljant idee' ('Row with university over brilliant idea') by De Blok & Duijst (2020).
68. *Aanhangsel Handelingen II* 2019-2020, nr. 1580 (Questions by Member of Parliament Wiersma (VVD) and responses by Minister van Engelshoven of Education, Culture and Science). Tweede Kamer der Staten-Generaal (2020a).
69. See also Fikkers et al. (2015), p. 15.

2.4 Shortfall in funding for growth

Once a knowledge-intensive start-up has overcome the impediments to growth associated with the early phases (see forgoing sections), another obstacle rears its head: it is very difficult for Dutch knowledge-intensive start-ups to secure the funding they need to finance their growth to a scale-up.

Knowledge-intensive companies have difficulty sourcing finance

The Dutch statistical institute Statistics Netherlands (CBS) has found that start-ups and innovative companies, in particular, obtain both less funding and less often.[70] Small businesses and start-ups are especially likely to give up after exploring the funding opportunities, often because they assess their chances as low. Innovative companies are looking for larger amounts of funding than their non-innovative counterparts of similar size, because they have to invest in things such as expensive laboratory space, pilot plants or expensive machinery. They therefore need more money than normal, whereas these are precisely the businesses where there is greater uncertainty about the market opportunities.[71] This makes it more difficult for knowledge-intensive companies to secure finance.

Scarcity of large funding 'tickets' for growth in EU and the Netherlands

Venture capital is one of the most common types of funding for high-tech start-ups (CBS 2019). Much less venture capital is available in the EU relative to the US, however, where eight times as much funding is raised for innovation through venture capital as in the EU. Moreover, a much higher proportion of this funding in the US is in large funds. When it comes to smaller funds, there is little difference between the US and the EU, but for funds amounting to more than 50 million, the differences start to increase. In 2018 there were eight funds in the EU with more than 250 million euros, compared with 70 in the US.[72] The small number of large funds mainly inhibits funding in later phases of start-ups and thus hampers their growth to scale-ups. Dutch start-ups are also relatively heavily dependent on local investors and are less successful than companies in London, Stockholm or Tel-Aviv at attracting investors from Asia or North America.[73]

This general picture in the EU also holds for the Netherlands. Although the amount of seed capital aimed at the earliest phases of start-ups has grown in recent years as a percentage of GDP, the capital available to fund their growth to scale-ups has actually

70. CBS (2019) p. 54.
71. CBS (2019) p. 36.
72. European Commission (2020) Chapter 8.
73. See Dealroom.co (2020), p. 10.

decreased.[74] Our interviews with stakeholders also reflected the concern that there are not enough funding 'tickets' available in the Netherlands to fund the growth path from start-up to scale-up.[75] Moreover, the funding in one phase also often does not seamlessly dovetail into the following phase.[76]

Investors insufficiently geared to knowledge-intensive start-ups and scale-ups

Several of our respondents also observed that many potential financial backers or investors are insufficiently tuned in to the specific dynamic of start-ups and scale-ups. Even where they do have experience with scale-ups in general, they often lack the specific knowledge and experience of *knowledge-intensive* companies and the sectors or technologies in which they operate. That knowledge and experience offers clear added value because it can not only help investors make a better judgement about the potential of the business, but also because it enables the investor to help the business progress further, for example by linking their knowledge and experience to relevant customers or other strategic players that can be of use to the start-up/scale-up in the further development of its business and business model. Successful examples of sectoral funds in other countries illustrate this point.[77]

2.5 Existing policy provides too little help for knowledge-intensive start-ups

A policy analysis reveals that there is room for improvement to increase the frequency of knowledge-intensive start-ups going on to become scale-ups and therefore be better able to realise their potential. At present, growing knowledge-intensive start-ups fall somewhat between two stools as regards policy.

The Netherlands has a whole raft of schemes and instruments aimed at knowledge development and entrepreneurship. This has helped improve the ecosystem for the emergence and early development of start-ups, and the performance of the Netherlands on this metric is steadily improving.[78] Yet this does not automatically mean that the conditions for the growth of knowledge-intensive start-ups are good. In fact, it seems as if the policy offers limited help in particular to growing knowledge-intensive businesses.

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74. European Commission (2020) Figure 8-18.
75. Despite the policy instruments intended to improve this, such as Invest-NL; see §2.5.
76. Techleap (2020a), p. 37.
77. For example the Yissum Venture Funds in Israel; see also the text box in §3.3.
78. In the Global Startup Ecosystem Report 2020 by Startup Genome, Amsterdam occupies 12th place in the global start-up ecosystems and takes third place in Europe (behind London and Stockholm). See Gauthier et al. (2020).

The policy on knowledge institutions assigns them a task in knowledge transfer, including commercialisation, and the entrepreneurship route is now an uncontroversial means of achieving this. But the precise role and strategy of knowledge institutions in relation to those start-ups is unclear, and each institution has its own approach, for example regarding the objectives of this 'valorisation' task and its role in supporting start-ups which spin out of the knowledge institution, or regarding the position and objective of the KTO or TTO. These differences are partly the result of a failure by government and parliament to state clearly precisely what they expect from knowledge institutions as regards stimulating knowledge-intensive start-ups. In practice, different institutions adopt a very different approach to intellectual property, shareholdership, financial support or coaching of start-ups. While this leads to the founding of a wide variety of knowledge-intensive start-ups, the many differences also translate into higher transaction costs: the lack of a generally standardised approach means that separate agreements have to be made in each individual case. The lack of clarity on the role expected of stakeholders also leads to fruitless discussion. All in all, this inhibits the growth of the knowledge-intensive start-ups in the later phases.

The policy on entrepreneurship has devoted much attention in recent years to promoting (nascent) entrepreneurship. This has led to an impressive increase in new entrepreneurs, but much of this increase can be ascribed to the rise of sole traders and freelancers and entrepreneurship without massive growth ambitions. But there has also been an increase in attention for (stimulating) new entrepreneurship specifically in relation to knowledge institutions. Partly thanks to the Valorisation Programme,[79] regional 'ecosystems' have been developed which support knowledge-intensive entrepreneurship. Not only have the KTOs/TTOs at knowledge institutions developed further, but incubators have also arisen aimed at helping fledgling (knowledge-intensive) companies. A number of schemes have also been launched with the aim of making more capital available for the start-up phase of such businesses.[80]

Partly because of this, the number of knowledge-intensive start-ups is increasing. However, policy has only recently started to turn attention to the next phase: growth. Knowledge-intensive start-ups often lose out in general initiatives in this phase: they often have to compete with other - not knowledge-intensive – companies, and their specific challenges (e.g. more complex business models, longer development times and more complex funding) work to their disadvantage. In fact, because of the higher risk and

79. Initiative from the Minister of Economic Affairs (2010) dated 11 May 2010, no. WJZ/10069658, amending the subsidy scheme for starting, growing and transferring businesses by introducing the Valorisation Programme, Government Gazette (*Staatscourant)* 2010, no. 7633.
80. Examples are the early phase funding scheme *(Vroegefasefinanciering)*, the Seed Capital Scheme and the Take-off-Programme.

complexity, they can easily find themselves languishing at the back of the queue in the competition for resources, policy attention and market-building. The more knowledge-intensive a business is, the more knowledge is also demanded of investors and policymakers in supporting it.

One hopeful factor is the recent attention for funding the growth of start-ups to scale-ups, partly because Techleap.nl, the successor of StartupDelta, is strongly focused on that growth trajectory.[81] The recently inaugurated state investment fund Invest-NL also has the brief of investing in promising growth companies in focus areas such as the energy transition. It remains to be seen how this works out in practice.

The growing policy attention for scale-ups is in itself a positive development. However, policy focusing on the growth phase does not resolve the various impediments to growth which already arise in the early phases of the start-up, including lack of sufficient entrepreneurial experience in the start-up team, weakening ambition in the start-up phase or restrictive agreements with knowledge institutions, leading to loss of growth potential. Moreover, the availability now of more growth funding makes it all the more important to focus on maintaining the ‘supply’ of new, ambitious knowledge-intensive start-ups with sufficient commercial competencies, in an environment that gives them effective support and continues to challenge them.

81. Techleap (2020a).

3

Recommendations for better growth to knowledge-intensive scale-ups

AWTI advocates – for knowledge-intensive start-ups – a greater focus from the start on their opportunities for growth. A good start is essential for growth. There must be sufficient entrepreneurial skills and experience within the start-up. Ensure that the agreements about shareholder structures and use of knowledge make growth easier to achieve. An environment needs to be created that feeds the ambitions of start-ups. Meeting these recommendations will enable more knowledge-intensive start-ups to grow successfully. To enable these businesses to make the leap to a scale-up, the funding market for financing the growth of knowledge-intensive start-ups must also improve, to increase the availability of 'smart capital'.

In this chapter we make a number of recommendations on how knowledge-intensive start-ups can get off to a better start and on improving the funding for scale-ups. We suggest solutions to the obstacles to growth that were described in the previous chapter.

AWTI advises government and parliament to create clarity about what is expected of knowledge institutions: what is their role in the 'valorisation' of knowledge and in supporting start-ups? What are or should be their objectives? A start-up has the greatest impact when it is able to grow successfully. Agreements made with knowledge-intensive start-ups, and the support given to these nascent businesses, must therefore prioritise the interests of the start-up and its growth. This also requires an environment which challenges start-ups to maintain their high level of ambition.

Following these recommendations will increase the chances of growth and development of knowledge-intensive start-ups. However, government at all levels as well as other stakeholders need to do more to ensure that start-ups realise their full potential. Central government has a key role in ensuring that the national and international 'environment' in which knowledge-intensive start-ups grow is properly aligned with the regional ecosystems in which they began life. We also see a role for government in driving the availability of finance that is better suited to the growth of knowledge-intensive start-ups; to date, the 'market' – in the Netherlands – has not picked this up to a sufficient degree.

Figure 4 presents the recommendations in schematic form and shows how the various barriers to growth can be broken down. The rest of this chapter discusses these recommendations in more detail. The first two recommendations are more general in nature. Recommendations 3, 4 and 5 focus specifically on ensuring a better start, while Recommendation 6 deals with finance.

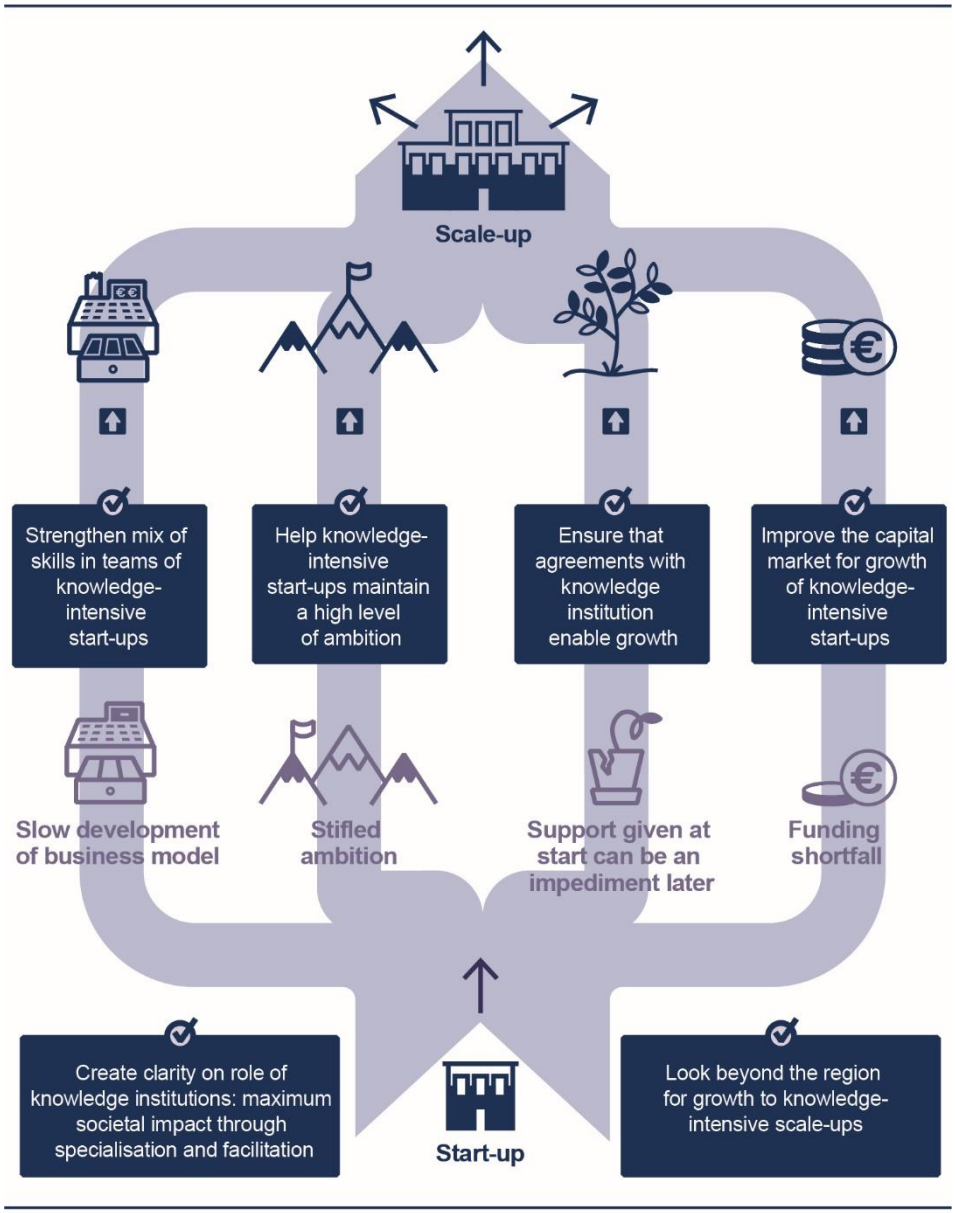

Figure 4. Summary of recommendations

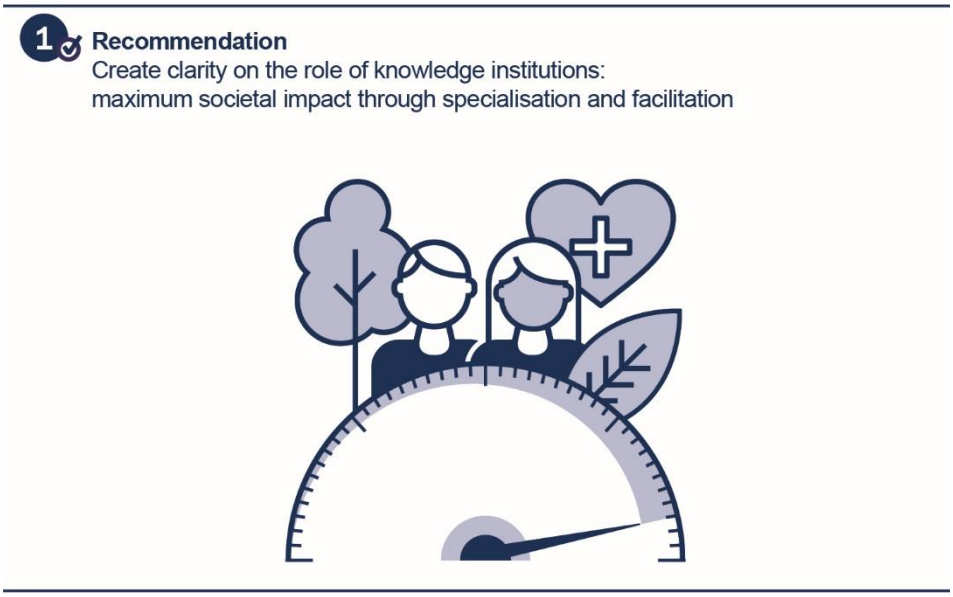

Figure 5. Recommendation 1

3.1 Recommendation 1: Create clarity on the role of knowledge institutions

Parliament and government must make clear what is expected of knowledge institutions with regard to ('valorisation' via) start-ups. In AWTI's view, the mission assigned to knowledge institutions should be as follows:

- Strive to maximise the societal impact of knowledge in the long-term.
- Target the support for start-ups to maximise the chance of growth.
- Ensure that agreements with the start-up enable growth (see Recommendation 5).
- Choose a limited number of themes on which an institution should seek to specialise and excel, including via start-ups.
- Consider carefully whether a start-up is the appropriate vehicle for commercialising certain knowledge.

Productively applying new knowledge via a start-up is a high-risk route, but one with great potential. To maximise the chance of success, it is important that the roles of all stakeholders are clear, starting with the role of knowledge institutions. As the developers

of the knowledge, they have a great influence on the initial stage, which is crucial for the chance of further growth.

The task of **government and parliament** is to make clear to knowledge institutions what is expected of them, whether they are universities of applied sciences, universities and related research institutes or organisations for applied research.[82] As regards utilising knowledge, including via start-ups, that expectation should be that knowledge institutions strive to maximise the impact of 'their' knowledge for society in the longer term. Specifically for start-ups, this means that the knowledge institution should maintain a consistent focus in its support for start-ups on making a success of their growth, rather than prioritising short-term financial gain, for example. Government and parliament can subsequently formulate the (broad) frameworks on how to define societal impact. Clearly formulated expectations such as these form the basis for the development of a successful start-up ecosystem around a knowledge institution.

Within these frameworks, each **knowledge institution**, such as a university or university of applied sciences, makes clear how it translates that societal impact into practice and what ambitions it has with regard to promoting start-ups.[83] The latter could be a theme on which the knowledge institution wishes to excel and raise its profile. If the 'profile funding' scheme for universities and universities of applied sciences as proposed earlier by AWTI were to be introduced,[84] this would release (extra) funds for those institutions, which could be used to support start-ups.

Knowledge institutions must be patient and dare to take a long-term strategic view (see the example of Leuven Research & Development in the box). It takes time to build up a properly functioning 'valorisation ecosystem'. It calls for a strategy with clear objectives, support from the institution's management and researchers, backed by structural resources which are not dependent on short-term returns. Starting from this basis, a professional organisation can be built with sufficient scale to enable promising knowledge-intensive start-ups to be successfully supported in a way that promotes growth. A good track record then helps in building a good reputation. It is also advisable for the knowledge institution to make a judgement on when commercialisation through a start-up (with the prospect of growth to a scale-up) is the best option. Quality must prevail over quantity, especially if the ultimate goal is to establish knowledge-intensive scale-ups.

82. Cf. AWTI (2019), §3.1, pp. 33-35 and AWTI (2017), p. 53.
83. See AWTI (2019) universities and universities of applied sciences as well as Recommendation in AWTI (2017) for organisations for applied research.
84. AWTI (2019), section 4.3, pp. 52-54.

***Good practice:* Leuven Research & Development (LRD)**

- LRD, based at KU Leuven University in Belgium, fulfils a similar role to the TTOs in the Netherlands. LRD has a visible presence within the university. Researchers know how to find it if they need help or have questions about the possibility of commercialising a new idea.
- LRD has built up considerable expertise over the years and enjoys an autonomous position.
- LRD is focused on the long term and does not expect start-ups to deliver immediate financial results. Nonetheless, LRD is now financially self-supporting, though the majority of its income comes from patents dating from the 1990s.
- LRD focuses on a limited number of start-ups which then receive very intensive support.

A clear focus on a limited number of themes helps the knowledge institution increase its impact over the long-term. When an institution adopts a specialist profile on a particular theme, it strengthens the 'ecosystem' around that theme and thus boosts the chance of the successful growth of start-ups. Smaller knowledge institutions, in particular, benefit from this, as the example of the University of Waterloo illustrates (see box). The success is magnified if knowledge institutions work together to coordinate their themes and support each other. The Universities of Toronto and Waterloo offer a good example of this (see text box).

***Good practice*: Waterloo-Toronto Corridor**

Knowledge institutions adopt a profile

- The University of Waterloo is a small university, but has successfully built a profile for itself by focusing on a few specific themes, such as artificial intelligence and nanotechnology.
- The University of Waterloo also works in partnership with the University of Toronto to raise the profile of the region as a good ecosystem for start-ups, with the two universities complementing each other and presenting themselves to the outside world as a coherent unit.

Government support

- Canadian immigration policy means there is wide availability of foreign talent in the region. Many foreign students stay on after graduating to work in Canada.
- The city and province of Toronto also invest heavily in the availability of office space in favoured locations, in order to create a good ecosystem for innovation.

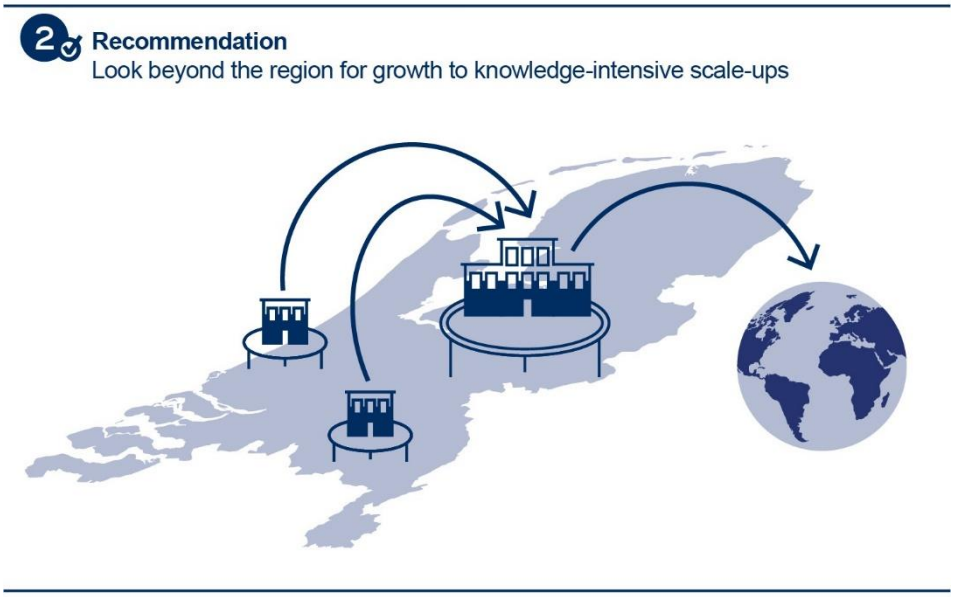

Figure 6. Recommendation 2

3.2 Recommendation 2: Look beyond the region for growth to knowledge-intensive scale-ups

The environment advocated by AWTI for promoting the growth and development of start-ups to scale-ups goes beyond the region and must have a national/international reach.

- Government and parliament should aim to develop a national/international scale-up environment with optimum conditions for growth.
- These efforts should be carefully dovetailed with the often regional ecosystems in which start-ups are born.
- It is important to recognise the variation between and strength of specific regions, but also to avoid unnecessary competition within the Netherlands.

A stimulating environment for scale-ups is the jewel in the crown of a network of strong regions with a clear profile. Knowledge-intensive start-ups benefit from having strong roots in a region which champions themes that are relevant for them. Regional actors such as **knowledge institutions**, **regional governments** and the **business community** work with others to build such regional ecosystems, thus providing a good base from which start-ups can emerge. It is vital to expand this base. A regional ecosystem can best

focus on a limited number of themes; this makes it more visible and stronger on those themes, which in turn helps to attract talent, relevant companies and investors (see the example of Toronto and Waterloo in the previous section).

However, as knowledge-intensive companies outgrow the start-up phase, they need more access than other companies to the best available talent and to venture capital that is attuned to the specific characteristics and needs of knowledge-intensive start-ups. It is essential to look beyond the confines of the region: growth takes place in a national/ international environment. National policy instruments should thus ideally dovetail seamlessly with the regional thematic focus in the start-up phase. This requires action from the government and parliament, as well as from regional actors.

Government and parliament must devote attention to further developing an environment that supports and nourishes start-ups. The national level is the logical springboard for companies seeking to penetrate the global market. AWTI believes that central government should make maximum effort to facilitate this through national incentivising regulations and conditions. Only then can knowledge-intensive companies succeed in attracting the talent and funding they need from at home and abroad. It is important to give consideration here to ensuring that national policy for start-ups and scale-ups is adequately coordinated with regional policy. Also compare the ambition of Techleap *'to act as one single hub'* (in relation to the growth of start-ups to scale-ups).[85] The government must acknowledge the variation between and strength of specific regions and (help) prevent unnecessary competition within the Netherlands. It is also important to remove obstacles for scale-ups wishing to relocate to a different region, for example because relocation can best facilitate their growth at a particular point in time. (Regional) funders should therefore not be permitted to (continue to) attach location conditions to the provision of finance for knowledge-intensive start-ups. Finally, a national scale-up environment requires the presentation of a unified face to the outside world, so that the Netherlands can position itself advantageously on the international stage.

85. Techleap (2020a), p, 13.

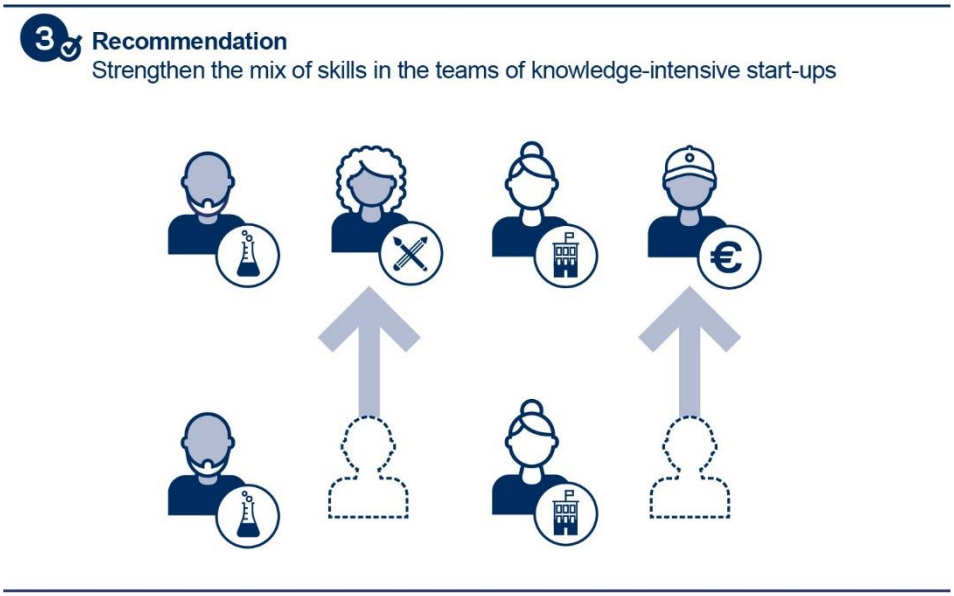

Figure 7. Recommendation 3

3.3 Recommendation 3: Strengthen the mix of skills in the teams of knowledge-intensive start-ups

It is crucial for the later growth of knowledge-intensive start-ups to strike a good balance between ‘knowledge’ and ‘entrepreneurship’. In practice, this mainly means strengthening the commercial and business knowledge present within the start-up.

Knowledge-intensive start-ups will only succeed in developing a revenue model that enables them to grow successfully to scale-ups if they are able to bring together the best combination of people. Our recommendation is to focus particularly on strengthening the commercial and business knowledge and experience in the teams – skills which are often underdeveloped in knowledge-intensive start-ups. Different public and private actors can help to put this recommendation into practice.

The **government** can contribute ‘indirectly’ by focusing its schemes aimed at helping start-ups on ensuring the presence of sufficient entrepreneurial skill and experience, for example by making support conditional on producing a good entrepreneurship plan, or the presence of a balanced team with sufficient entrepreneurial experience. In the case of

a public-private partnership, the private partners could be expected to (help) ensure the presence of sufficient business experience in the start-ups.

Knowledge institutions should facilitate 'their' knowledge-intensive start-ups, including as regards the development of business skills. The growing attention for entrepreneurship in (higher) education provides a good basis for this. In supporting 'their' start-ups, it is recommended that institutions highlight the importance of having the right mix of skills in the start-up team and helping start-ups to achieve that mix. Ideally, the support given to start-ups helps them get off the ground with a team that possesses the necessary competencies and experience. One route which is common in the United States but as yet relatively untested in the Netherlands involves a university asking experienced entrepreneurs from its own ranks or from an active network of alumni to begin a business with specific 'knowledge' (from the university) or to strengthen a start-up team.

A facility such as an **incubator** can also play a key role, offering support to start-ups in areas such as business knowledge and experience. There are already some good examples of incubators and accelerators (see box). We recommend that such facilities be placed at a certain remove from the knowledge institution. A further advantage is that the help offered by an incubator can be based on the start-up's interests, for example during any negotiations with the knowledge institution. If the incubator is part of the knowledge institution, this can give rise to conflicts of interest. Moreover, in practice incubators have proved their worth as (local) breeding grounds for a much larger group of (knowledge-intensive) start-ups than just those which spin out of a knowledge institution.[86] It is also more logical from this perspective to see an incubator as a basic facility that forms part of the regional ecosystem for (knowledge-intensive) start-ups, which is not entirely dependent on a knowledge institution.[87]

Good practice: **YES!Delft**
This is an incubator which helps new start-ups in a variety of ways, such as developing a suitable business model, providing introductions to the business community, and attracting investors. YES!Delft has been hailed one of the best incubators in the world by UBI Global.[88]

86. For example, the final evaluation of the Valorisation Programme shows that the majority of supported companies do not sprout from research that was performed at the institutions. See Janssen et al. (2018), pp. 59-60.
87. Also compare the 'top locations manifesto' (Manifest 'Toplocaties') which calls for investments in the physical aspects of innovation ecosystems by ten Dutch campuses. See Duc et al. (2020).
88. Meyer & Sowah (2018).

Experienced entrepreneurs, investors, multinationals and **business consultants** could play a bigger role in strengthening the start-up teams. They bring to bear complementary knowledge and experience about finance, being an employer, internationalisation and business operations. They in turn learn about new opportunities and developments in their discipline and in the fields of technology and innovation in general. They thus help strengthen the focus on market orientation and contribute experience on matters such as negotiating about intellectual property or finance. They can also help at a slightly greater distance, contributing their knowledge and experience through panels or incubators to help start-ups in their search for a gap in the market or a suitable business model. Good examples of this can be found in the Creative Destruction Lab or the KTH Innovation Panel (see text boxes).

Good practice: **Creative Destruction Lab (University of Toronto)**
As part of their studies, high-achieving business administration students at the University of Toronto can help start-ups develop their business model. The students help businesses which are launched both within and outside the university.

Good practice: **KTH Innovation Panel**
Researchers and students at KTH Royal Institute of Technology in Stockholm who need help with commercialising an idea can seek help from this panel. They can present their idea online and complete a questionnaire, after which they receive feedback from the panel, which is made up of experienced people from business, many of them KTH alumni. This speeds up the process of finding the right business model.

Some **knowledge institutions** also give knowledge-intensive start-ups access to physical facilities such as laboratories, supercomputers or libraries (see the example of the Leiden Bio Science Park in the text box). However, the world does not stand still, and there is wide variation in the quality of support. Investor networks, practical business knowledge and global ambition could all be cranked up further (see the example of the Yissum Venture Funds in the box). The fact that the Yissum Venture Funds have for a long time been giving advice on the commercial development of start-ups is also an example of the role that investors can play in improving the quality of the start-up team. Knowledge institutions and incubators still have more to learn; the ending of the Valorisation Programme cannot be used as an excuse to cease the efforts.

***Good practice*: Leiden Bio Science Park**

This cluster of (start-up) companies focuses specifically on life sciences. The Park houses a number of companies and research groups, as well as the majority of biotechnology start-ups in the Netherlands. Leiden University has made available a wide range of high-tech research facilities which can be used by companies located in the Park.

***Good practice:* Yissum Venture Funds**

Each of these funds, which are linked to the Hebrew University of Jerusalem, targets a specific theme – biotechnology, food and the environment, nanotechnology – and stimulates entrepreneurship in each of these areas.

Integra Holdings is the biotechnology fund. It is a collaboration between the Hebrew University and several international investors. The latter are given priority in having sight of the latest biomedical innovations at the University. The fund seeks to ensure that innovations are fully exploited and therefore not only invests, but also provides long-term advice on commercialisation.

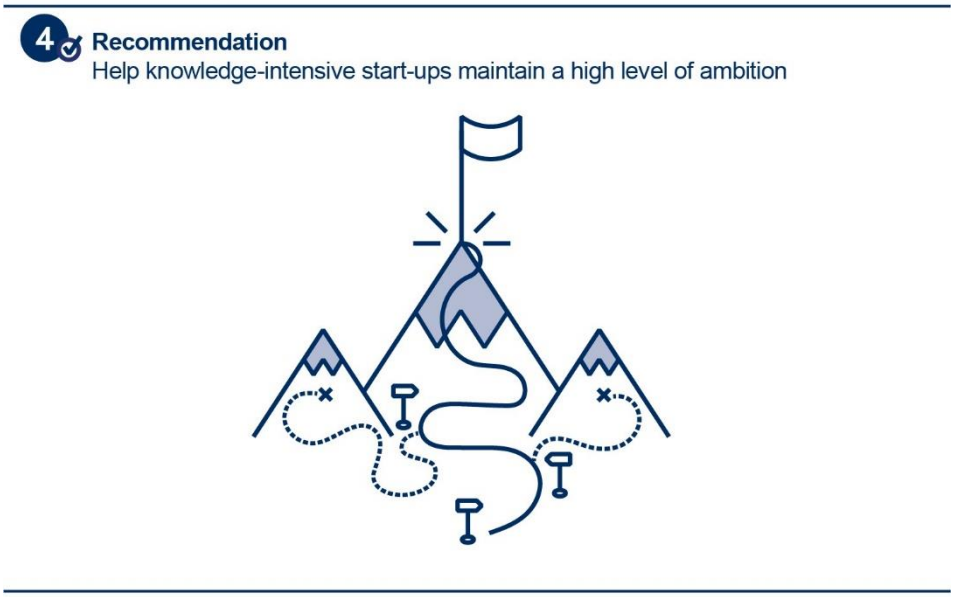

Figure 8. Recommendation 4

3.4 Recommendation 4: Help knowledge-intensive start-ups maintain their ambitions at a high level

The foundation for successful growth is laid right at the start. It is therefore key to ensure an environment which stimulates knowledge-intensive start-ups to set and maintain high ambitions.

Knowledge-intensive companies which succeed in striking the path to growth find themselves operating on the world stage, and it is therefore crucial that start-ups develop in a social setting where there is a 'subculture' in which global ambition is the norm.[89] This high level of ambition must be there from the start. Knowledge-intensive start-ups must dare to focus on the international market and on having or attracting the very best people to work for them.

Government and parliament can create the environment for knowledge-intensive start-ups to attract and retain international talent, for example by developing a scheme

89. Cf. VARIO (2018).

specifically for start-ups aimed at recruiting knowledge migrants.[90] It is also usual in the international context to pay staff of start-ups (partly) in shares. This is not an attractive option in the Netherlands from a tax perspective. Making it more attractive to pay staff of start-ups in shares would make it easier for the Netherlands to attract the talent that is needed to power the growth of start-ups. Moreover, the further development of initiatives such as Techleap and the Academic Startup Competition (see text box), both of which support ambitious entrepreneurship, should be supported.

Good practice: **Academic Startup Competition (ASC)**

The ASC focuses on start-ups which have the ambition to upscale to international level within five years. The start-up with the best scaler plan is rewarded with a trip to the US funded by the Dutch Ministry of Economic Affairs and Climate Policy, in order to learn what it is like to do business there.

The ambition comes in the first place from the knowledge-intensive start-up/scale-up itself, but the setting undoubtedly plays a role in keeping that ambition 'hot'. This means there is a task for **accelerator coaches, incubator managers, investors, policymakers** and others who are involved with knowledge-intensive start-ups in feeding those ambitions. They can do this by making a high level of ambition a condition for providing support or finance. The coaches, managers, investors and policymakers do not of course need to be entrepreneurs themselves, but they can contribute to a stimulating subculture. The ambition will also need to be continually stimulated and challenged by the incumbent stakeholders during the further development phases of the start-up.

90. See letter to Parliament from the State Secretary for Justice and Security (2019) dated 1 July 2019 on a residence scheme for essential staff of start-ups (Kamerstukken II, 2018-19, 30 573, nr. 174).

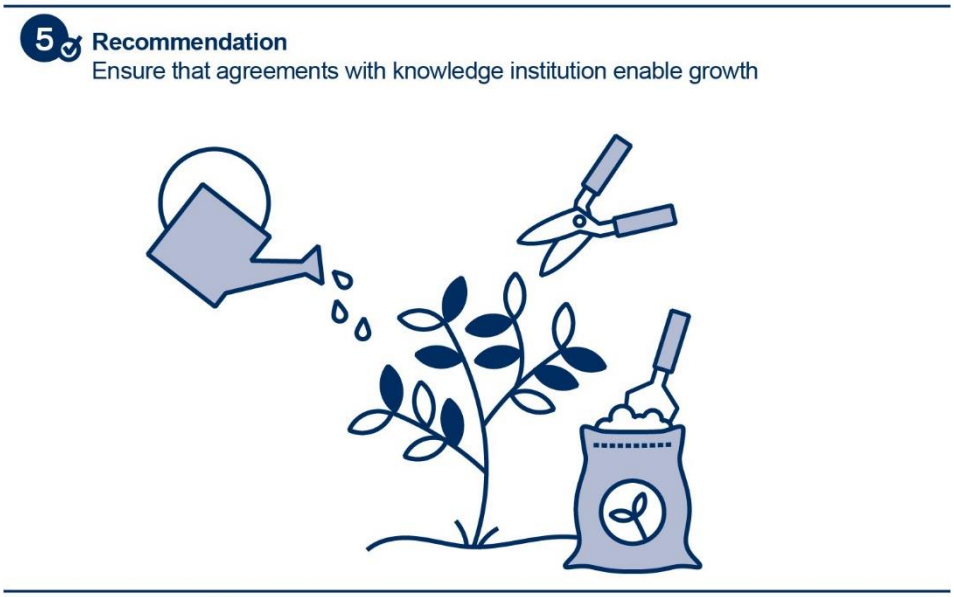

Figure 9. Recommendation 5

3.5 Recommendation 5: Ensure that agreements with knowledge institution enable growth

Knowledge institutions need to ensure that start-ups get off to a good start which offers the prospect of further growth.

- Make clear agreements on the use of the knowledge institution's intellectual property which do not unnecessarily impede the growth of the start-up.
- Develop a model contract between knowledge institutions and knowledge-intensive start-ups governing the use of intellectual property, which strikes a balance between the interests of both parties.
- Avoid constructions in which the role of the knowledge institution forms a barrier to growth (e.g. because a role as shareholder puts off investors in a subsequent phase). Knowledge institutions should not take a voting shareholding in a start-up.

Government and parliament should create a platform for dialogue between representatives of knowledge institutions and knowledge-intensive start-ups. This dialogue can be used to determine how best to deal with intellectual property and the potential participation of knowledge institutions in the fledgling companies. The dialogue

must take place among a group of parties which represent the different interests involved. Examples of parties which (can) represent the interests of start-ups are Techleap, incubators, accelerators, experienced entrepreneurs or investors.

Dutch **knowledge institutions** have for some years had in place a 'guideline' for dealing with intellectual property rights.[91] This guideline is quite loose and is therefore not suitable for use as a standard. It needs to be critically reviewed and where necessary tightened up in the dialogue between (representatives of) knowledge institutions and entrepreneurs. Once a broadly supported model has been developed, every knowledge institution should apply it to start-ups. Where this does not happen, clear reasons must be given for this (the 'comply or explain' principle). The model must be easy to find and easy to use. A uniform guideline must also be developed for dealing with intellectual property in relation to students' own discoveries and inventions, aimed at maximising the start-up's chances of success.[92] Representatives of students and start-ups should be involved in establishing this guideline, so that the different interests are in balance.

Researchers and students at knowledge institutions must be properly informed about the regulations around intellectual property. Incubators can provide information and put themselves forward as sources of information. There are also other ways of advising start-ups, as the example of IusStart shows (see text box).

Good practice: **IusStart (KU Leuven)**
Start-ups by students at KU Leuven University who do not yet have sufficient funds for legal advice can approach IusStart. As part of their Master's degree programme, law students give advice on aspects including intellectual property.

Finally, we would advise knowledge institutions against investing in start-ups by acquiring (voting) shares. Refraining from voting rights seems wise, because ultimately the interests of the start-up and of the knowledge institution may not run in parallel. Moreover, it is difficult for knowledge institutions to fulfil a role as an investor over the long term.

91. De Nooijer et al. (2016).
92. Cf. the motion tabled by Wiersma and Bruins on students wishing to start a business using a company's intellectual property (Kamerstukken II 2019-2020, 35 300-VIII, nr. 43). See Tweede Kamer der Staten-Generaal (2020c).

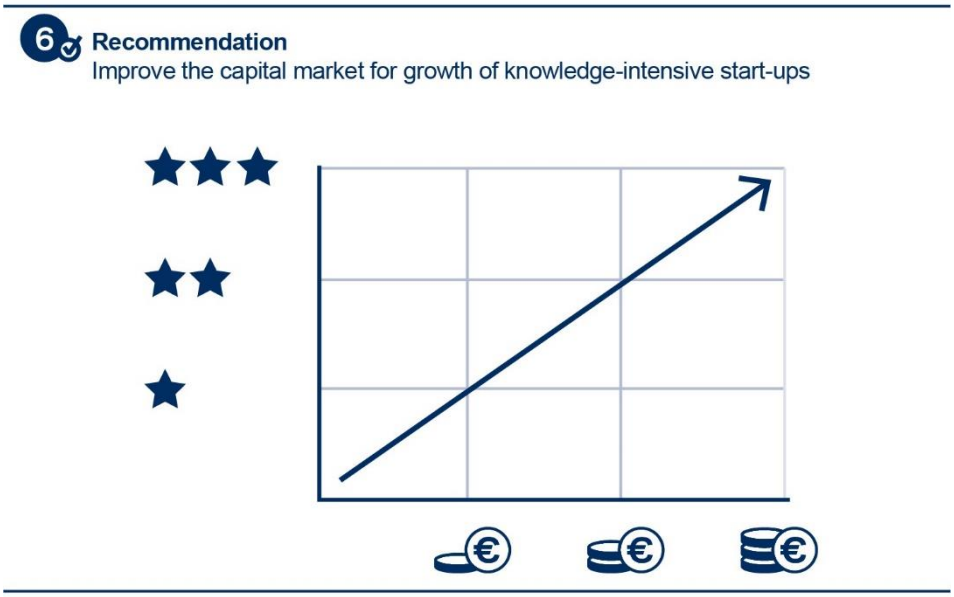

Figure 10. Recommendation 6

3.6 Recommendation 6: Improve the funding market for the growth of knowledge-intensive start-ups

A properly functioning funding market is crucial for growth.

- ► Ensure that more larger funding 'tickets' are available to finance the growth of start-ups to knowledge-intensive scale-ups.
- ► Ensure that (potential) financial backers are more attuned to the specific circumstances of knowledge-intensive start-ups and scale-ups.

The attention and involvement of the **government** in financing the growth of knowledge-intensive companies is justified given the specific circumstances. A proportion of knowledge-intensive start-ups and scale-ups are for example involved in the development of key technologies,[93] and the government may take a view that there is a strategic interest at stake, which justifies government involvement.[94] Knowledge-intensive start-ups

93. See also AWTI (2020a).
94. Cf. the example of the company Smart Photonics. See NOS (2020).

can have great societal and economic potential, but the reality is that they are in a worse starting position than 'ordinary' companies on the capital market (see §2.4).

To improve the prospects of knowledge-intensive growth companies, the (central) government could take a lead in setting up public-private funds aimed at financing the growth of knowledge-intensive start-ups. The government could act as a 'lever' by putting a premium on private initiatives and thereby, for example, doubling the amount of private funding. The government could also make private investment in start-ups and their growth to scale-ups more attractive, for example by offering tax breaks.[95] Or the government could act as a 'catalyst' by taking the lead in attracting private funding to finance the growth of knowledge-intensive companies. Setting up such funds at EU level could have even more impact: it would enable larger amounts of capital to be raised, and they would be of sufficient scale to make setting up more thematic funds a more viable proposition. Finally, the government could challenge the financial sector to innovate and make venture capital 'smarter'.

The government could achieve this by setting standards for the quality of the **financial actors** with whom it partners, or for the public-private funds themselves. The term 'quality' in this context also incorporates professionalism and innovative capacity on the part of the financial actors. Investors must themselves innovate, for example through data-driven analyses of the start-up,[96] sophisticated team assessments,[97] or the introduction of more innovative arrangements.[98] It is also important that a financial actor has sufficient experience with the specific dynamic of knowledge-intensive start-ups and scale-ups. Expertise in the sectors where the knowledge-intensive companies are active has clear added value and ought to be a condition. A high-quality investor is also able to help the start-up progress by strengthening the start-up team to ensure that it has the right mix of the necessary skills and expertise. It is also beneficial if the financial actor has alliances with other parties which could potentially offer subsequent funding tickets (see the example of the Gemma Frisius Fund in the box). It is also key to establish and maintain links with funds abroad, including EU funds, because the Netherlands is (too) small on its own.

Where the government makes a public contribution to (private) funding in earlier phases of a knowledge-intensive start-up, it would also do well to impose 'quality standards' on the private finance provider.

95. An international Seed Enterprise Investment Scheme (United Kingdom).
96. E.g. https://goldeneggcheck.com/.
97. De Mol et al. (2016).
98. Bariller et al. (2020).

Good practice: **Gemma Frisius Fund (KU Leuven)**

This fund helps start-ups at KU Leuven University by providing long-term investments (7-10 years) and advice on growth. The Fund also has many contacts, including abroad, and therefore the ability to set up a second funding round and facilitate further growth.

Good practice: **Life Sciences Partners (LSP)**

LSP is a specialist investment fund targeting companies which develop drugs, medical technology or diagnostic tests. As well as an office in Amsterdam, it also has branches in Munich and near Boston. The team is highly experienced across a wide range of fields, including medical, regulatory and financial aspects. Over the last 30 years LSP has invested over €2 billion in more than 120 companies. LSP has also made use of the Dutch Venture Initiative instrument, in which the government provides 'top up' funding.

Appendixes

Appendix 1 Parliamentary request for advice

Voorzitter

Tweede Kamer
DER STATEN-GENERAAL

Aan de Adviesraad voor Wetenschap, Techniek en Innovatie (AWTI)
T.a.v. de voorzitter
Dhr. prof. dr. U. Rosenthal
Prins Willem Alexanderhof 20
2595 BE Den Haag

Postbus 20018
2500 EA Den Haag
T 070 318 30 33

Den Haag, 5 november 2019

Geachte heer Rosenthal,

In haar vergadering van heden, 5 november 2019, heeft de Tweede Kamer, op grond van artikel 30 van het Reglement van Orde van de Tweede Kamer der Staten-Generaal, besloten de Adviesraad voor Wetenschap, Techniek en Innovatie advies te vragen over de doorgroei van academische startups naar levensvatbare bedrijven.

In de bijlage treft u de brief van de vaste commissie voor Onderwijs, Cultuur en Wetenschap met het verzoek aan.

Namens de Kamer vraag ik u aan dit verzoek te voldoen.

Met vriendelijke groet,

Khadija Arib
Voorzitter van de Tweede Kamer
der Staten-Generaal

Bijlage

BRIEF VAN DE VASTE COMMISSIE VOOR ONDERWIJS, CULTUUR EN WETENSCHAP

Aan het Presidium

Den Haag, 3 oktober 2019

Namens de leden van de vaste commissie voor Onderwijs, Cultuur en Wetenschap verzoek ik u aan de Kamer voor te stellen[1] om de Adviesraad voor Wetenschap Technologie en Innovatie (AWTI) het volgende voor te leggen.

Op 17 september jl. heeft de Kamer het werkprogramma 2020-2021 van de AWTI ontvangen (Kamerstuk 35 300 VIII, nr. 4). Daarin worden onder andere de adviezen 'Valorisatie' en 'Verspreiding van innovaties door transities' aangekondigd. Binnen de Kamer bestaat behoefte aan de AWTI te verzoeken in (een van) de adviezen ook aandacht te besteden aan de volgende vragen.

Op welke wijze kunnen hindernissen worden weggenomen om meer startups te laten doorgroeien naar levensvatbare bedrijven die ook voor meer werkgelegenheid gaan zorgen? Nederland staat bekend om het grote aantal academische startups, maar deze leiden nauwelijks tot relevante extra werkgelegenheid. Welke (typisch Nederlandse) kenmerken kunnen hiervan de oorzaak zijn? Welke maatregelen kunnen worden genomen, onder andere op de arbeidsmarkt, om doorgroei te stimuleren?

Ik verzoek u te bevorderen dat de Kamer hierover zo spoedig mogelijk een beslissing neemt.

De voorzitter van de commissie,
Tellegen

De griffier van de commissie,
De Kler

[1] Conform besluit in OCW-procedurevergadering d.d. 26 september 2019.

Appendix 2 Summary of background study

The Erasmus Centre for Entrepreneurship (ECE) was commissioned by AWTI to carry out a study of the development of knowledge-intensive start-ups in the Netherlands and, where relevant, the support they receive from knowledge institutions and the start-up ecosystem. That study (*Knowledge-intensive start-ups in the Netherlands and the universities' entrepreneurial ecosystems*) is published simultaneously with this report. This appendix summarises the key findings.

Knowledge-intensive start-ups grow more slowly than other start-ups

Based on the dataset used by the ECE, the study observes that:

- While knowledge-intensive start-ups (spun out of a knowledge institution or company R&D department) have more staff than other start-ups at launch, after five years the staff numbers are broadly unchanged, whereas at other start-ups they have increased.[99]
- Although knowledge-intensive start-ups do achieve growth in sales (from €800k after one year to €1,100k after five years), that is much less than other start-ups (which average sales of €7,000k after five years).

In short, knowledge-intensive start-ups in the Netherlands do less well than other start-ups in the first five years, in terms of both employment and sales.

Start-up ecosystems

'Ecosystems' are developing around knowledge institutions and (innovative) companies, which influence the sharing of knowledge and (successful) entrepreneurship based on that knowledge. For spin-outs from knowledge institutions, the ecosystem around that institution is important in the first phase. ECE accordingly studied university ecosystems for the birth of start-ups. A literature review produced seven critical factors for the success and failure of knowledge-intensive start-ups,[100] including *meso*-factors which impinge directly on the ecosystem. These factors are presented in the table below.

99. The analysis for the draft report showed that, within a given sector, a university spin-off or company spin-out generates less employment than other start-ups in that sector.
100. To a certain extent these criteria also apply for the ecosystems around companies and corporate spin-outs, but since the ECE interviews were focused on the ecosystems surrounding universities, those other ecosystems are left out of consideration here.

Table 1 Critical success and failure factors for knowledge-intensive start-ups

level	critical factor		
micro	Scientific orientation	Market experience and knowledge	
meso	Direct and proactive support	Network and knowledge	Conflicting strategy/goals
macro	Entrepreneurial infrastructure	Industry influence	

In the 13 interviews conducted by ECE, the following picture emerged regarding these factors in the Dutch university ecosystems for start-ups:

- *Scientific orientation:* A strength of university spin-offs. The reputation of the university adds to the 'substantive' credibility of knowledge-intensive start-ups.
- *Market experience and knowledge:* A weakness in university spin-offs. Often limited business skills at foundation. University founders sometimes leave the start-up. An external CEO is sometimes recruited, but not always. Attention has grown for strengthening these skills via TTOs and incubators, but in practice the commercial credibility of university start-ups remains a problem.
- *Direct and proactive support:* Wide variation in appreciation of the relationship between knowledge-intensive start-ups and TTOs. Some respondents take a very negative view, others are more positive. Positive reactions to the (current) support for finding funding in the early phase, but negative about the inability to become independent in a later phase. Some respondents feel that TTOs are mainly concerned with the interests of the university.
- *Network and knowledge:* Again, very variable responses. The knowledge institution's network helps in attracting talent and sometimes in establishing links with relevant companies. However, the university network does *not* help in finding the funding needed for growth of the start-up (moreover, the involvement of university through IP or shares is sometimes an impediment). Neither does the start-up benefit from the knowledge institution in terms of access to knowledge.
- *Conflicting strategy/goals:* This tension is undoubtedly present in practice, for example through frictions if the university is a major shareholder in the start-up. This also calls for clearer, transparent agreements around intellectual property.
- *Entrepreneurial infrastructure*: The Netherlands supports entrepreneurship, but the conservative funding structure hinders growth. For example, start-ups need a single large sum of money (rather than a series of smaller sums as is usual in the

Netherlands). There also appears to be a certain risk-aversion among academic entrepreneurs.

- *Industry influence:* ECE highlights differences between sectors here. In the care sector, for example, they found that intellectual property rights are more often retained by the parent institution, keeping start-ups more dependent on the institution from which they originated.

Summarising the seven ecosystem criteria, the picture that emerges is that the value of the university for the knowledge-intensive start-up is at the very least ambiguous: there are a number of pros, but undoubtedly also some cons. In particular for the further development of university spin-off companies has the 'support' from the university limited effect or is it even an impediment.

Table 2 Own (i.e. AWTI) assessment of the criteria based on the ECE report

level	critical factor		
micro	Scientific orientation **+** good		Market experience and knowledge: **-** weakness
meso	Direct and proactive support: **+** first phase **-** follow-up	Network and knowledge **+** talent **0** knowledge **+/-** network	Conflicting strategy/goals **-** IP agreements - shareholding
macro	Entrepreneurial infrastructure **+** 'climate' **-** funding		Industry influence **~** sector-dependent

*Key: **+**/green = positive; **-**/red = negative; **0** /black = neutral; **~**/ black = variable.*

Best practices from other countries

ECE also looked at three examples from institutions in other countries which have been successful in promoting start-ups, with a view to drawing lessons for the Netherlands. They were ETH Zurich (Switzerland), KTH Stockholm (Sweden) and the Hebrew University of Jerusalem (Israel). The lessons that can be drawn from this and good examples that can serve as an inspiration are incorporated in this AWTI report (see Chapter 3).

Appendix 3 Reviewers

In the final phase of preparing this report, a draft was submitted to external reviewers, who were asked to reflect on the consistency of the draft report and identify any gaps. The reviewers' comments were then incorporated in the report under responsibility of the Council.

The reviewers for this report were:

- Dr Rudy Dekeyser, Managing Partner at Life Sciences Partners (LSP)
- Anne-Wil Lucas, Director of Kennispark Twente

Appendix 4 Interviewees

AWTI interviewed around 40 individuals in preparing this report. Most of the interviewees are listed below. A small number preferred to remain anonymous; their names have been left out of the list.

Marleen Bax	Erasmus Centre for Entrepreneurship
Dave Blank	University of Twente and Saxion University of Applied Sciences
Shiri Breznitz	University of Toronto
Anne Cramwinckel	Techleap.nl
Edgard Creemers	Guide Plus
Joost Dieleman	Ministry of Economic Affairs and Climate Policy
Roel Esselink	Association of Universities in the Netherlands (VSNU)
Leonardo Fuligni	Erasmus Centre for Entrepreneurship
Aard Groen	Groningen University
Myrthe Hooijman	Techleap.nl
Robin van IJperen	Ministry of Education, Culture and Science
Martijn Janmaat	Ministry of Economic Affairs and Climate Policy
Matthijs Janssen	Dialogic
Marcel Kers	PlantLab
Ilkay Kizil	Ministry of Education, Culture and Science
Linco Nieuwenhuyzen	InnovationQuarter
Constantijn van Oranje	Techleap.nl
Arno Peels	former AWTI Council member
Yordi Rienstra	Confederation of Netherlands Industry and Employers (VNO-NCW) and MKB-Nederland
Mediha Şahin	Ministry of Economic Affairs and Climate Policy
Marian Sanders	Ministry of Economic Affairs and Climate Policy
Dennis Schipper	Demcon
Steven Schuurman	Elastic
Erik Stam	Utrecht University
Anne Strobos	Techleap.nl
Hester Tak	Oost NL
Caroline Tempel	Ministry of Education, Culture and Science
Job Teurlinx	Ministry of Economic Affairs and Climate Policy
Liselotte van Thiel	Ministry of Economic Affairs and Climate Policy
Ben Verwaayen	Keen Ventures
Robert Verwaayen	Keen Ventures
Martijn Verwegen	Association of Universities in the Netherlands (VSNU)

► Lucien Vijverberg	Ministry of Economic Affairs and Climate Policy
► Jan Jacob Vogelaar	Utrecht School of Economics
► Robert Jan van Vugt	Yes!Delft (formerly)
► Peter Wennink	ASML
► Rob Wolthuis	Confederation of Netherlands Industry and Employers (VNO-NCW) and MKB-Nederland

Profile of interviewees for the background study by Erasmus Centre for Entrepreneurship

For the study commissioned by AWTI, the Erasmus Centre for Entrepreneurship conducted 13 in-depth interviews. An overview of the profiles of the interviewees is given below:

► Chief Scientific Officer	Spin-off from Maastricht University
► Founder/CEO	Spin-off from University of Amsterdam
► Chief Operations Officer	Spin-off from University of Amsterdam
► Chief Executive Officer	Spin-off from TNO
► Chief Executive Officer	Spin-off from a KNAW research institute
► Chief Executive Officer	Spin-off from TU Delft
► Chief Executive Officer	Spin-off from Wageningen University & Research
► Founder/CSO	Spin-out from Philips
► Founder	Spin-off from Utrecht University
► Founder	Spin-off from Eindhoven University of Technology
► University employee	TTO of Erasmus MC
► University employee	TTO of Wageningen University & Research (WUR)
► University employee	TTO of Eindhoven University of Technology (TU/e)

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