Awti Advisory council for science, technology and innovation

SEIZING OPPORTUNITIES WITH KNOWLEDGE

STRENGTHENING THE LINKS BETWEEN RESEARCHERS AND ENTREPRENEURS

Awti Advisory council for science, technology and innovation

The Dutch Advisory Council for Science, Technology and Innovation (AWTI) publishes solicited and unsolicited advisory reports to the Dutch government. Its independent reports are strategic in nature and focus on the contours of government science, technology and innovation policy. Council members are drawn from knowledge institutes and the business world. AWTI's work is founded on the principle that knowledge, science and innovation are vital for the economy and society, and will become more important in the future.

The office is located in The Netherlands:
Prins Willem-Alexanderhof 20
2595 BE Den Haag
t. 070 3110920
e. secretariaat@awti.nl
w. www.awti.nl

Seizing opportunities with knowledge

Strengthening the links between researchers and entrepreneurs

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Colophon

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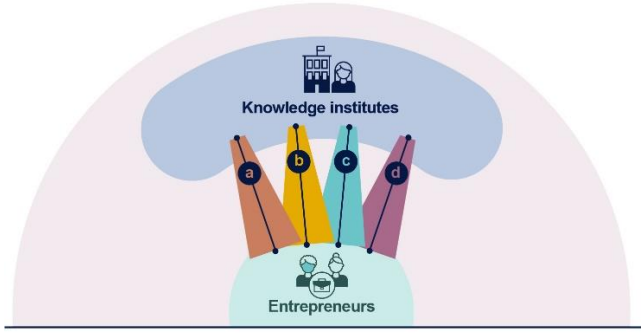
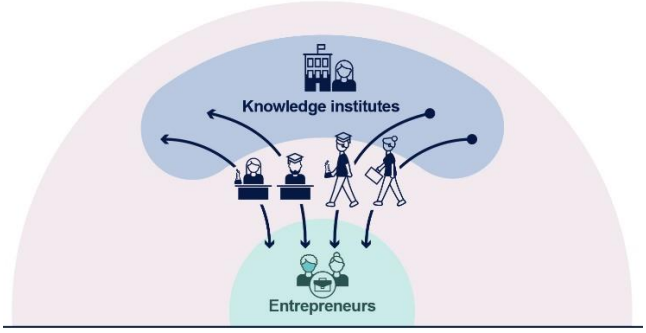
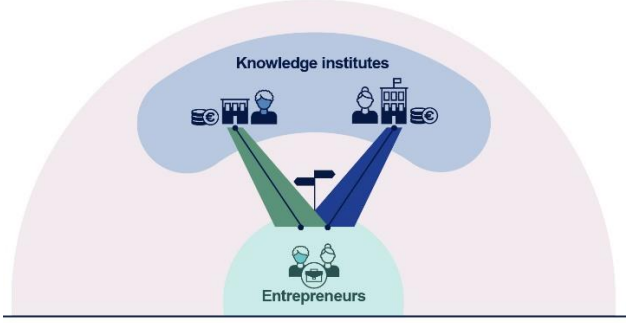


1. Strengthen the links between researchers and entrepreneurs



2. Facilitate the sharing of knowledge by people



3. Encourage customised valorisation with professional support

Summary

New knowledge is vital to keep the economy healthy and resolve societal challenges. Key here is that businesses can benefit from the knowledge developed by knowledge institutes. Whilst that does happen at present, it is not yet optimal. The government would therefore do well to take specific measures to strengthen the links between researchers and entrepreneurs, enabling opportunities to be grasped from a basis of knowledge.

Strengthen the links and collaboration between researchers and business

Government policy needs to focus on making it easier for entrepreneurs and knowledge institutes to come into contact with each other and work together more effectively. By doing so, the government will be creating the right conditions for knowledge-sharing. Present policy does this insufficiently, partly because it is too little geared to the different needs of businesses, especially in the SME sector. In this report, the Dutch Advisory Council for Science, Technology and Innovation (AWTI) looks principally at the forms of knowledge-sharing which have the potential to deliver much better results.

Businesses and researchers operate in very different cultures, and as a result come into contact with each other too little, and when they do, their collaboration is not always effective. Knowledge from research also continues to be difficult for businesses to access. Targeted measures are therefore needed to bridge the gap, particularly for smaller and less innovative companies. While it certainly helps to locate businesses and knowledge institutes in close proximity, more is needed to realise genuine knowledge-sharing.

Moreover, the policy on knowledge transfer to businesses devotes too little attention to the crucial role played by people as carriers/purveyors of knowledge. Here again, there is a great deal of untapped potential, especially for less innovative businesses.

Recommendations

To improve the knowledge-sharing with businesses, AWTI makes the following recommendations:

1. Strengthen the links between researchers and entrepreneurs.

- Make knowledge more accessible, easier to find and understandable for non-scientists, such as entrepreneurs, both through open access and by strengthening the ‘knowledge desk’ function.
- Bridge the gap between research and business through close collaboration right along the ‘chain’ from fundamental to applied and practical research.

- Ensure that questions from companies go to the right researchers. Smaller and less innovative companies have a particular need for help here. Create more ‘knowledge brokers’ targeting these companies, who can bring together companies and researchers. Support small companies in working together to formulate a knowledge demand by making seed money available.
- Promote collaboration between knowledge institutes and companies. This can be done first through joint research and development agendas, ensuring that smaller companies and ‘newcomers’ are included, and secondly, by bringing researchers and entrepreneurs together and enabling them to work alongside each other (co-location and co-creation).

2. Stimulate knowledge transfer via people. There is lots of untapped potential here. People make the difference.

- Foster cross-fertilisation via dual roles, with one and the same person working at a knowledge institute and a company. There is potential for this to grow, especially between SMEs and universities of applied sciences. Also make it more attractive to switch temporarily between a knowledge institute and a company.
- Make more effective use of student (graduation) internships as a means of knowledge-sharing between knowledge institutes and companies. Ensure that the ‘broker function’ between companies and higher education institutes works well.
- Ensure that policy reflects the key role that graduates or researchers play in knowledge transfer if they go on to work at a company. Stimulate this, for example through ‘innovation traineeships’, a combination of an internship followed by a job within the company.

3. Encourage knowledge institutes to treat valorisation as customisation with professional support and provide them with sufficient means for that.

- Customised valorisation and professional support can substantially boost the effectiveness of the knowledge transfer to entrepreneurs. Focus on valorisation within knowledge institutes where it leads to social impact. Ensure that government and parliament contribute to strengthening the position of valorisation within knowledge institutes.
- Ensure that knowledge institutes set out their long-term valorisation goals in their strategic plans and (as part of that) their goals regarding knowledge transfer to entrepreneurs. Support knowledge institutes in the further development of a professional organisation and flourishing ecosystem for knowledge transfer to business.

1

Introduction

1.1 Knowledge needs to flow if it is to lead to prosperity

The Covid pandemic has generated a substantial mobilisation of the research and innovation community worldwide. A great deal of research, publicly and privately funded, has been carried out in a short space of time, and partnerships have been forged with civil-society organisations and companies. The development of new knowledge was crucial here,[1] but ultimately it was the coordination between knowledge development, entrepreneurship and (potential) users which led to practicable and available solutions. The development of vaccines involved collaboration with large corporations, but there were also any number of initiatives involving smaller and medium-sized enterprises. For example, the Dutch applied research institute TNO launched the 'Brains4Corona' initiative in order to deploy its own expertise in partnership with companies and civil-society organisations with a view to devising many new solutions for problems during the Covid pandemic.

The Covid pandemic is an example of a societal challenge which has had a major impact on society over the past year. But the Netherlands faces more major challenges, on both the societal and economic fronts: dealing with climate change and achieving the transition to a sustainable economy; dealing with population ageing; (continuing) the vital task of improving the competitiveness of the Dutch national economy.[2] Meeting these challenges will require innovation. Developing that innovation will in turn require that scientists, entrepreneurs, talented employees and civil-society organisations join forces and work together.

Knowledge is a key ingredient for this innovation. Knowledge 'flows' between different individuals and organisations. It does this through networks of knowledge institutes, companies and civil society organisations. Together or singly, people develop knowledge and work together to apply (new) knowledge. Some of this new knowledge will impact on society directly (for example if it leads to behavioural change), or indirectly through civil-society organisations. But in many cases, new knowledge will be applied by companies, leading to innovation in products or services. Figure 1 illustrates the many 'routes' by which knowledge is shared and leads to societal impact.

1. See *Science, Technology and Innovation Outlook* (OECD 2021).
2. See Scientific Council for Government Policy (WRR) (2020) Hiroaki (2019), Perez, Johnson, & Kleiner (2017), and an interview with Joseph Stiglitz (Stellinga en Van Noort 2019).

This linking of new knowledge to businesses and civil-society organisations undoubtedly takes place, but not yet optimally. The Netherlands has a very strong knowledge base, with research that scores highly internationally. Yet the social and economic impact of that knowledge lags behind. For example, the Netherlands is in the top 5 in the *Global Innovation Index* for generating new knowledge and ideas, but ranks only around 25 for the impact this has.[3] Within the EU, the Netherlands has moreover slipped from the status of *innovation leader* to *strong innovator*, partly because the Dutch SME sector has become less innovative than the EU average.[4]

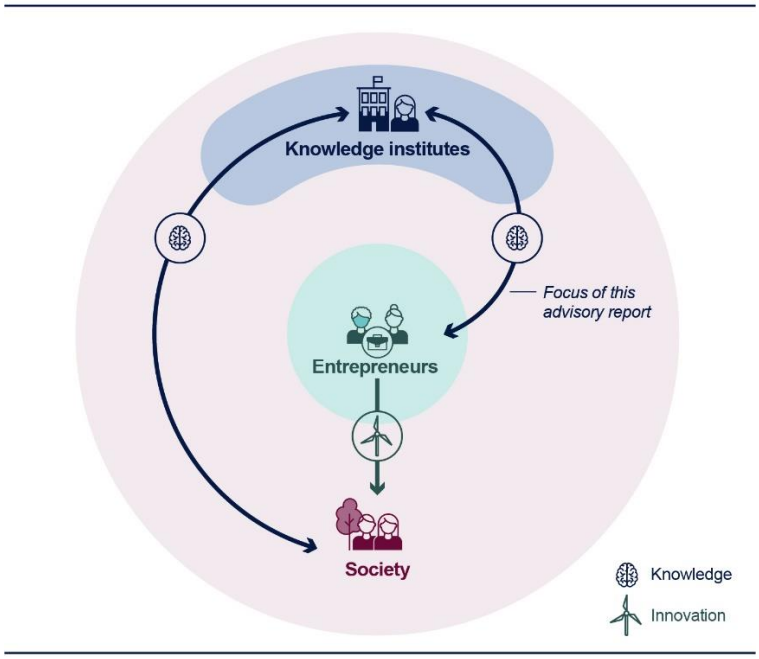


Figure 1 Knowledge exchange between knowledge institutes, entrepreneurs and society *This advisory report focuses on the exchange of knowledge between knowledge institutes and entrepreneurs*

3. See the Global Innovation Index (Dutta et al. 2019); The Global Competitiveness Report (Schwab 2019) shows a comparable picture. Overall, the Netherlands comes in at number 4. The production of new knowledge (research and development) is good and improving (ranked number 13), the interaction excellent (position 5), but the application of knowledge (commercialisation) has fallen compared with a year earlier to position 23.
4. See European Innovation Scoreboard (2021): https://ec.europa.eu/growth/industry/policy/innovation/scoreboards_en.

The less than optimum impact of (new) knowledge in the Netherlands is especially concerning at a time when major societal and economic challenges are placing demands on our capacity as a society and economy to use (new and existing) knowledge to grasp the newly arisen opportunities and to contribute to solutions for newly arisen problems.[5] A country cannot rely too heavily on the small group of companies and organisations which are already engaged in knowledge development – on the one hand because during such transitions, it is precisely initiatives from 'new' 'parties that are often essential,[6] and on the other because our society and economy needs to remain healthy in the broadest sense. We will therefore have to innovate across the piece, including parties that currently do so to only a limited extent. To do this, people will need (access to) the requisite knowledge.

1.2 Scope: focus on knowledge development with industry

In this report we focus specifically on knowledge-sharing between (public) knowledge institutes and companies (see Figure 1). Public knowledge institutes are an important source of new knowledge. They include universities, research institutes, applied research organisations and universities of applied sciences. The research carried out by these bodies generates a great deal of knowledge, which is then transferred to students through teaching at universities and universities of applied sciences. Our focus is on how knowledge is shared between knowledge institutes and companies. This is thus specifically knowledge which is utilised via (sharing with) industry, resulting in both economic and societal impact. The energy transition is a good example: innovations which lead to energy-saving contribute to the achievement of our societal goals, but are at the same time a 'product' which generates extra employment.

As Figure 1 shows, the 'route' by which knowledge flows from knowledge institutes via industry to generate value in society is not the only available route. Knowledge institutes naturally also have direct interactions with civil-society organisations, government agencies, intergovernmental and non-governmental organisations, other knowledge institutes and citizens. Knowledge is also developed and applied here, and generates value. However, that is not the focus of this report, which concentrates on the route via entrepreneurship.

The reason for this is the crucial importance for the Netherlands of ensuring good knowledge-sharing with businesses, including small and medium-sized enterprises (SMEs). Entrepreneurs have the drive and the resources to use the (new) knowledge to innovate. Entrepreneurship is about recognising and grasping opportunities, something

5. See Freeman & Louçã (2002) and Utterback (2006).
6. See also *De staat van Nederland innovatieland* (Goetheer, van der Zee, en de Heide 2018:74).

that is very important for creating new value for society. If the knowledge-sharing with entrepreneurs does not work well, this will not only undermine the competitiveness of the Netherlands, but will also mean we are unable to make sufficient progress in achieving the necessary transitions, due to a lack of solutions.

There are sufficient indications that knowledge-sharing between knowledge institutes and businesses in the Netherlands is not yet functioning optimally. The Netherlands lags behind comparable countries such as the United Kingdom, Finland or Belgium as regards the share of (innovative) firms collaborating with universities or other public research institutes.[7] The Netherlands also underperforms the EU average on the share of new, innovative products in total revenues.[8] Small and medium-sized enterprises (SMEs), in particular, have difficulty connecting to knowledge institutes. It remains a major challenge for these firms to identify suitable knowledge partners and networks and thus to establish a connection, alongside developing the relevant skills to integrate external knowledge in the innovation processes within their own business.[9] On top of this, much of the SME sector is not highly innovative. The European Commission sees it as an important challenge for the Netherlands to make the SME sector more innovative by strengthening the links with knowledge institutes and their 'new' knowledge.[10]

Dynamic of knowledge sharing

The sharing of knowledge takes many forms. Sometimes a scientist themselves sees the potential applications of a particular 'discovery' and subsequently embarks on a quest to find suitable partners (with the right knowledge and expertise) to develop it further. Conversely, firms have a need for knowledge that is crucial for their products and services and related innovation. For example, if a farmer wishes to invest in 'circular agriculture', they will have many questions about the soil in relation to circular farming. They will then go in search of knowledge institutes and researchers who might be able to set up research which answers those questions.[11]

7. See *Balans van de wetenschap* (Rathenau Instituut) (Koens et al. 2020)
8. See the European Innovation Scoreboard (JRC 2019).
9. See *Enhancing the Contributions of SMEs in a Global and Digitalised Economy* (OECD 2017 figure 2).
10. See European Commission report for the Netherlands (EC 2019); the Dutch government also acknowledges this, see e.g. 'MKB-actieplan' (2018:12–13).
11. This topic was raised during a debate in the Dutch town of Ede (2019) organised by AWTI and Rathenau Instituut.

1.3 Request for advice

The government has identified one of the major challenges in relation to innovation as 'strengthening knowledge transfer and the valorisation process for more impact'.[12] The government has previously expressed its concerns as to whether SMEs have sufficient access to knowledge and knowledge institutes.[13]

Optimum sharing of knowledge between knowledge institutes and companies does not happen automatically.[14] For small and medium-sized firms, in particular, more is needed to convert knowledge from research into value by strengthening the knowledge transfer and valorisation process.[15] The government recognises that this 'step' is not automatic and that more support is needed for (innovative) companies and barrier-free collaboration between private and public operators.[16]

It is therefore important to strengthen the sharing of knowledge between knowledge institutes and companies. In this report, AWTI concentrates on the question of how the links between (public) knowledge institutes and businesses can be strengthened. It is a matter both of improving the existing links and of ensuring that a higher proportion of firms are connected to knowledge institutes. That will not only give companies access to the right knowledge to enable them to grasp the opportunities that arise in a changing world, but will also challenge knowledge institutes with new demands for knowledge and joint research.

Against this backdrop, AWTI addresses the following question:

How can the Dutch government create the right conditions to ensure optimum knowledge-sharing between knowledge institutes and businesses?

This question is not new, but the present context, in which our society and economy need to recover from the Covid pandemic and also find an answer to a number of other major societal challenges, have made it urgent.

The government creates the conditions and sets the frameworks within which the relevant players such as knowledge institutes, companies and other organisations in the innovation ecosystem give practical form to knowledge-sharing. The way they do this ultimately determines the success of that knowledge-sharing. This report accordingly

12. Government strategy 'Versterken van onderzoeks- en innovatie-ecosystemen', (2020:14).
13. 'MKB Actieplan' (2018).
14. See the evaluation of the valorisation programme and the government reaction to it (Janssen et al. 2018; Ministerie van Economische Zaken en Klimaat and Ministerie van Onderwijs Cultuur en Wetenschap 2018).
15. See also: *De staat van Nederland innovatieland* (Goetheer et al. 2018).
16. Government strategy 'Versterken van onderzoeks- en innovatie-ecosystemen', (2020), p. 14.

looks beyond the conditions and frameworks that the government itself can set, and also makes recommendations about how the relevant players can best translate the (existing or future) possibilities for knowledge-sharing into practice.

AWTI recently published a report on the 'route' for linking knowledge and entrepreneurship via start-ups: *'A better start.* The key to growth of knowledge-intensive start-ups (2020). That topic will therefore not be discussed in this report; rather, the Council refers to the analysis and recommendations contained in that report.

Approach

To answer the request for advice, we first analysed how knowledge-sharing between public knowledge institutes and industry currently operates. Via which 'pathways' does knowledge reach companies, and how do the knowledge needs of companies reach (researchers at) knowledge institutes? And how does joint knowledge development take place? To answer these questions, AWTI carried out a literature review, drawing on a variety of scientific and professional publications. These sources were supplemented and deepened in interviews with entrepreneurs, scientists, policymakers and other stakeholders (see list of interviewees in Annex 3). Our findings are described in Chapter 2.

Based on those findings, AWTI has formulated a number of specific recommendations for improving knowledge-sharing between public knowledge institutes and companies; these are discussed in Chapter 3.

Project group and reviewers

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

In the final phase of the preparation of this report, a draft was submitted to two external reviewers (see Annex 2), who were asked to reflect on the consistency of the draft report and to highlight any observed gaps. The reviewers' comments were then incorporated under the responsibility of the Council.

2

Analysis

2.1 Effective knowledge sharing requires customisation

Knowledge-sharing is about (jointly) searching for and applying knowledge. That takes place in networks of different individuals and organisations and takes many forms, which we call 'knowledge pathways'. We identified 18 different knowledge pathways for the sharing of knowledge between knowledge institutes and companies; these can be found in the table in Annex 1. Examples include 'dual roles' for employees working both at a knowledge institute and a company; internships and final year students in company placements; patents and licenses; spin-offs; and field labs and innovation work placements.

Each knowledge pathway is a good 'fit' for certain conditions or particular networks of knowledge institutes and businesses. There is wide variety among both knowledge institutes and companies, and it is crucial to keep this differentiation in mind – not just for a good analysis of knowledge-sharing, but also to formulate effective policy. A differentiated approach can ensure a better match between mutual expectations and focus attention on those knowledge pathways that are the most relevant and effective for the particular parties involved.

Diversity of knowledge institutes

There is a wide variety of (public) knowledge institutes in the Netherlands. Universities of applied sciences have strong links with occupational practice, and focus on practical research. Senior secondary vocational colleges also have strong links with occupational practice (though focused mainly on training). There are also organisations carrying out applied research (such as TNO or Deltares).[17] Universities, both general universities and universities of technology, carry out an enormous amount of (fundamental) research on a wide variety of topics. Similar research also takes place within separate research institutes (such as the Dutch Research Council (NWO) or the Royal Netherlands Academy of Arts and Sciences (KNAW)). There is also differentiation within those institutes between the various departments, some of which lend themselves more readily to links to practical applications than others, but there are also differences between research groups. These different starting points also shape the possibilities for content, agenda-setting and knowledge type, as well as the form of knowledge-sharing.

17. For a recent overview and evaluation of the various TO2 institutes, see (Ministerie van Economische Zaken en Klimaat 2021; Wim van Saarloos et al. 2021).

Diversity of companies

There is also wide diversity among entrepreneurs and their companies:

- First, in the degree to which they are focused on innovation (from no/little focus to a very strong focus on innovation and research & development);
- Second, in terms of size (from sole trader to large multinational).

This influences the needs of businesses in terms of the *content* of the knowledge they are seeking, but also dictates the most suitable *form* of that knowledge-sharing and what possibilities the business has to achieve it.

Highly innovative companies derive their competitive edge (partly) from having (access to) new, advanced knowledge. They will accordingly be continually in search of that type of knowledge. For less innovative companies, the most important consideration is to improve what they are already doing based on knowledge that is a good match for their business activities. As well as differences in how innovative they are, differences in the size of companies are also relevant: small companies generally have fewer or even no people available to maintain contacts with knowledge institutes, influence joint research agendas or 'absorb' external knowledge into the day-to-day business practice. The sector in which a company is active is also a relevant factor in determining the need for new knowledge and the way in which the transfer takes place.

Take a differentiated view of knowledge-sharing

With all this diversity on the part of both knowledge (institutes) and entrepreneurs and their businesses, it will come as no surprise that different (types) of knowledge institute and different 'knowledge pathways' will be most relevant for different types of businesses. (And the converse is also true: seen from the perspective of a knowledge institute, different types of business and knowledge pathways will be the most relevant for each knowledge institute, depending on its 'profile').

Figures 2, 3 and 4 illustrate this differentiation of knowledge-sharing pathways. They show the typically relevant pathways for three types of business, based on our analysis of the knowledge pathways, the results of which can be found in the table in Annex 1.[18] The horizontal axis shows the type of knowledge institute with which these companies share knowledge via the knowledge pathway in question. The research institutes are not named separately here, but should be imagined as the most closely corresponding knowledge

18. Three of the 18 pathways in the table in the Annex are not shown in Figures 2, 3 or 4, because they are likely to make only a very limited contribution to knowledge-sharing with businesses. They are: advisory board roles for researchers; participation by researchers and entrepreneurs in regional boards; and conferences and fairs.

institute (university of applied sciences, university of technology or general university) for the type of research. An example to explain the figure: if highly innovative companies (Figure 2) engage in strategic research partnerships with knowledge institutes, in most cases we are talking about universities (both universities of technology and general universities). The vertical axis shows the 'carrier' of the knowledge: does the knowledge-sharing take place mainly via a person who transfers knowledge explicitly or implicitly, or is that knowledge expressly contained in a document or an object? It should not be forgotten that people as carriers of knowledge have proved to be extremely important for knowledge transfer in support of innovative entrepreneurship,[19] for example in transferring 'tacit knowledge' which is 'in people's heads'.[20] Given the importance of this transfer via people, institutes which focus largely on training, such as senior secondary vocational colleges and universities of applied sciences, also occur in the figures below. Naturally, some knowledge pathways involve a combination of implicit and explicit knowledge, and are therefore positioned midway along the vertical axis.

Figure 2 illustrates the position for highly innovative companies. Access to the most advanced knowledge is crucial for these companies. The time horizon is also longer. Moreover, the company will often be able to devote a relatively high degree of attention (in the form of staff and budgetary capacity) to internal or external knowledge-sharing and application. Strategic research partnerships (such as QuTech of ArcNL) are also typically found in this category of companies. These companies also invest in dual roles for researchers working both in the company and in a knowledge institute, for example in the form of endowed chairs at universities. The knowledge sought by these companies is mainly located in universities and applied research organisations, and this is reflected in most of the knowledge pathways. The knowledge pathways 'scientific publications' and 'patents and licences' are mainly relevant for this category of companies.[21] There are also various other knowledge pathways from which highly innovative companies can benefit, which also occur for less innovative companies, for example public-private partnerships for joint research, contract research or mobility of researchers or graduates between knowledge institute and company.

19. See *Managing the Flow of Technology* (Allen 1995),
20. See *The Knowledge-Creating Company* (Nonaka en Takeuchi 1995) and *Knowledge of the firm, combinative capabilities, and the replication of technology* (Kogut en Zander 1992).
21. Making good use of the possibilities offered by patents etc. is more difficult for SMEs and less innovative companies: see Policy Memorandum *Modernisering Rijksoctrooiwet 1995* (Ministerie van Economische Zaken en Klimaat 2020).

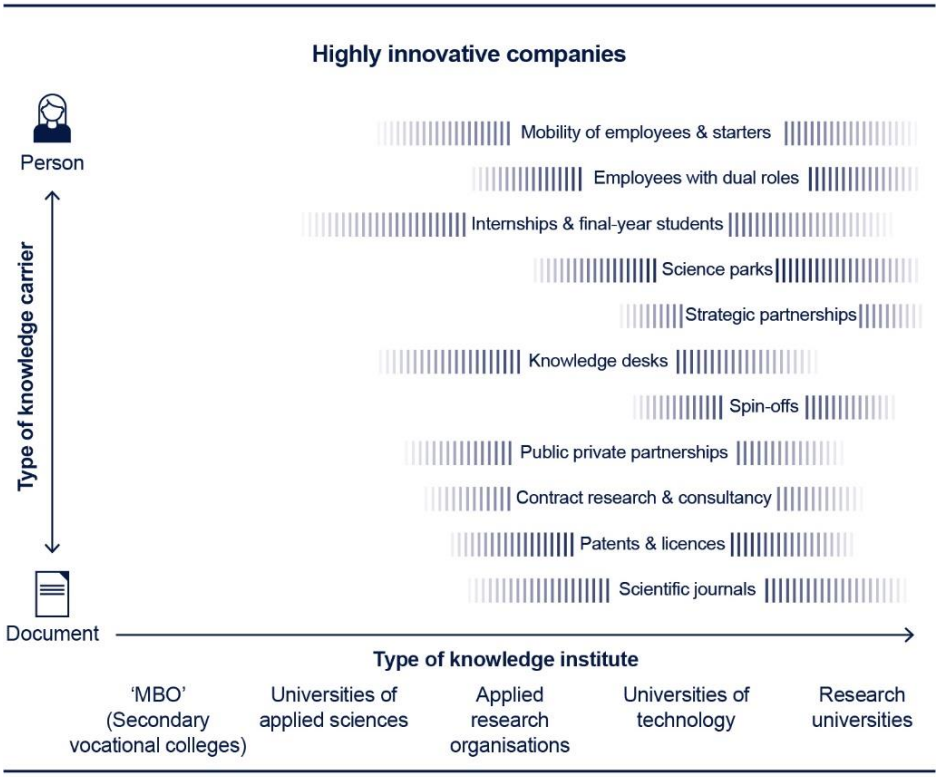


Figure 2 Relevant pathways for knowledge-sharing with highly innovative companies

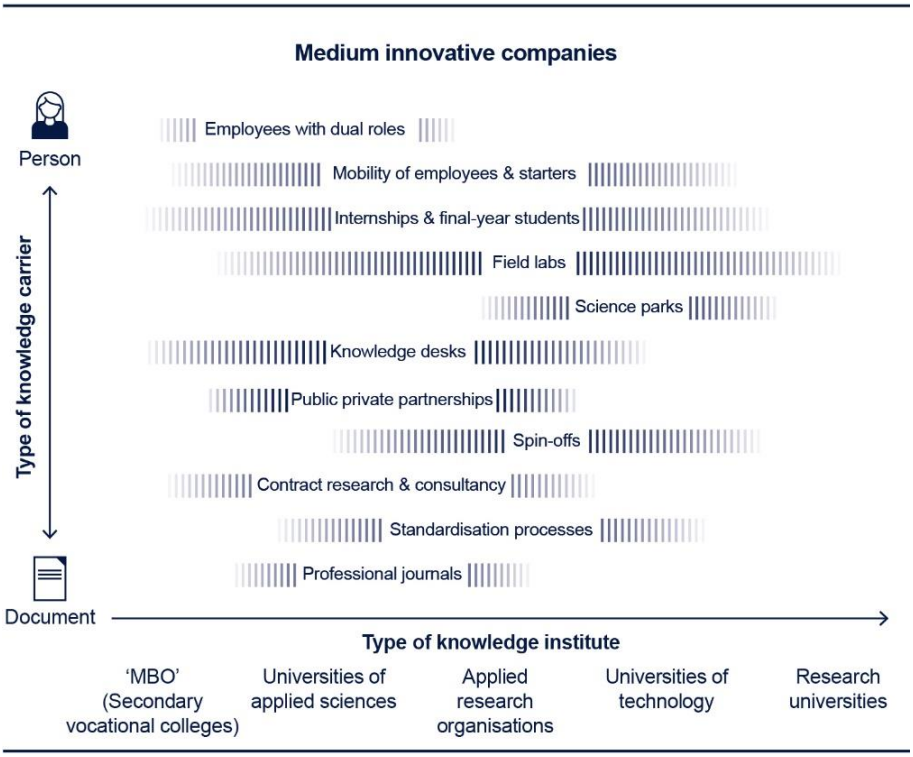


Figure 3 Relevant pathways for knowledge-sharing with medium-innovative companies

For companies in the 'medium-innovative' category (Figure 3), it is important that the knowledge is more closely aligned with their operations. Their knowledge needs are mostly focused on practice and implementation, and can generally be met in the short to medium-term. As a result, there is a greater emphasis in this category of companies on knowledge-sharing with universities of applied sciences and organisations for applied research. To some extent, the same knowledge pathways are relevant for these companies as for highly innovative companies, but medium-innovative companies seek partnerships with different types of knowledge institute. Here, too, other knowledge pathways can also be relevant, for example presentations of new innovations in trade journals, or participation in field labs, where entrepreneurs and researchers come together physically to address practical questions. Standardisation programmes can also contribute to the knowledge transfer to these companies, whereby design and quality agreements are made on specific products or services. Incorporating recent knowledge in the standard makes it available to companies, which will then apply it.

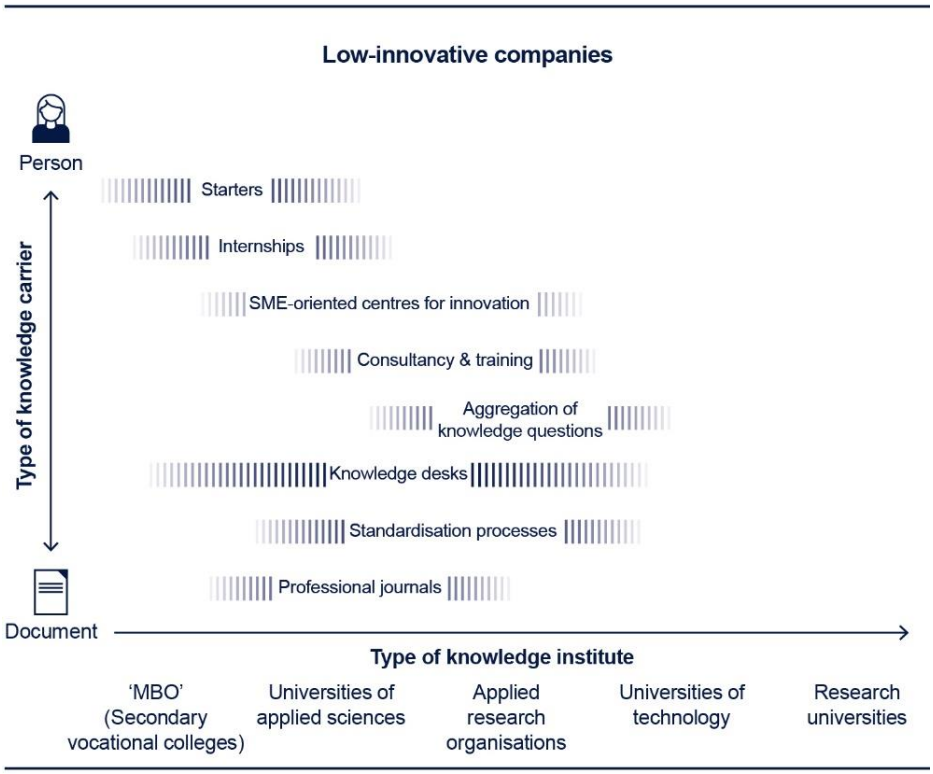


Figure 4 Relevant pathways for knowledge-sharing with low-innovative companies

For the 'broad SME sector', which is not highly innovative (Figure 4), it is of particular importance that the knowledge is well aligned with their operational practice and is easy to apply. This requires yet other knowledge pathways. Demand pooling is essential here, because these companies are often not able to articulate their needs on a one-to-one basis. These companies can also benefit from knowledge contributed by students during internships, or brought into the company by new employees who have just graduated. Innovation or SME work placements can also be an effective means of sharing knowledge for these companies.

In the remainder of this chapter we will reflect on how well the identified knowledge pathways function for the different types of company (and different types of knowledge institute), after which these figures will return to give an indication of where there is room for improvement.

Condition: sufficient knowledge absorption capacity

In practice, less innovative companies in particular find it a challenge to 'absorb new knowledge into their business operations. Sufficient 'knowledge absorption capacity' is a condition for allowing knowledge to flow from one organisation to another and also for ensuring that the knowledge actually reaches the right destination. AWTI has devoted an earlier report to this subject.[22] It is a fact that companies with good business operations, where the skills and knowledge of entrepreneurs, managers and employees are all kept up to date, implement innovations faster and more successfully.[23] Smaller companies in particular often lack the money, time and staff capacity to do anything with knowledge or research. The government recently explicitly cited this issue of the (required) absorption capacity for new knowledge in the SME sector as a major challenge in the application and upscaling of innovations.[24]

Focus on ecosystems and the international dimension

All these interactions between knowledge institutes, companies and other stakeholders take place within an 'ecosystem' that is a product of the economic structure, social network and culture in a given region or sector. Within that ecosystem, knowledge is developed and applied in all kinds of ways and in differing combinations. It does however have to be borne in mind that knowledge development takes place in a broader international setting, as do the activities of the companies.

Moreover, companies compete with each other, and this too influences the processes around knowledge-sharing. For research that is further removed from the market, companies can safely join forces; but once it gets closer to the market, it is important to be alert to the competition rules, for example to avoid the risk of a prohibited competition-limiting agreement between companies. But that competition also influences the interaction between knowledge institutes and entrepreneurs: where knowledge institutes like to publish and share their knowledge, an entrepreneur may benefit from keeping that knowledge within their business in order to achieve a competitive advantage.

22. See *Capturing, processing and valorising knowledge. On the importance of knowledge and absorptive capacity* (Adviesraad voor wetenschap, technologie en innovatie 2016c).
23. See *Laggard firms, technology diffusion and its structural and policy determinants* (OECD 2020)
24. Government strategy 'Versterken van onderzoeks- en innovatie-ecosystemen' (2020:12).

2.2 Businesses and knowledge institutes not connecting enough

The links between knowledge institutes and entrepreneurs are not yet optimised. They come into contact with each other too little, and when they do, both parties may discover that they speak a 'different language', as their working methods and objectives are often not parallel. There is much to be gained here.

Clarity regarding the role of knowledge institutes will create a better match for collaboration

Society and businesses are looking for knowledge. Businesses use that knowledge to meet the needs of their customers better and to improve their ability to resolve (societal) problems. In their search for that knowledge, society and businesses turn to knowledge institutes. Public knowledge institutes, in addition to their mission of carrying out research and/or providing teaching, also have the task of transferring knowledge, to society and businesses among others.[25] Each knowledge institute formulates its own vision on how it sees its role in relation to knowledge transfer. That forms part of the institute's 'profile',[26] which among other things sets out what type(s) of research the institute wishes to perform and how it plans to transfer that knowledge. It is quite feasible for one institute to place the emphasis on developing fundamental knowledge where the possible applications are as yet unclear; that will make it difficult to reach businesses and mean that this fundamental research will not be a focal point in the chosen profile. Another institution could opt for a profile based on research geared more towards practical applications, and could then make knowledge transfer to businesses a clear focus in its profile. AWTI has previously advised that it is a good thing for knowledge institutes to have this freedom to choose their own, distinctive profile, but that they must ensure that, together, they meet the 'needs' of society.

With regard to the task of transferring knowledge to society and businesses, a knowledge institution must provide answers in its profile to questions such as: to what extent does the institute involve civil-society organisations or companies in developing its research agenda, with what kind of companies does the institute wish to collaborate, and in what different ways? And what is the objective of the knowledge institute here? It helps if government and parliament, based on their system responsibility, make clear what they

25. For universities and universities of applied sciences, see Section 1.3, subsections 1 and 3 of the Dutch Higher Education and Research Act (WHW).
26. See *Shaking up the system,* (Adviesraad voor wetenschap, technologie en innovatie 2019:36)

expect from the system as a whole and from the different types of institution as regards knowledge transfer.

If knowledge institutes have indicated clearly what can be expected of them in terms of research and knowledge transfer, this also helps in managing the expectations of companies. It is however important that knowledge institutes also act in accordance with their chosen profile. There will also be few disappointments if knowledge institutes make clear how they see the role of companies in any collaboration. What commitment do they expect from a company, depending on the type of collaboration?

'Pull': companies looking for knowledge have difficulty finding it

If we look at companies that are actively seeking or have a need for particular knowledge (or the research intended to produce it) – the 'pull' effect from companies – we observe the following:

- It is not always easy for companies to find the knowledge they need:
  - A great deal of research is carried out, which means a great deal of (new) knowledge is published in many different places; it is already difficult to find the right knowledge within this plethora of information, but it is made even harder because some of that knowledge is not 'openly' accessible, and the knowledge that is 'open' is often difficult to find and to access easily.[27] (Though a clear profile by a knowledge institute does enhance the recognisability and findability of knowledge).
  - For most companies, the search for new knowledge is just one of the many activities in which they have to engage, and they often do this ad hoc.
- Even if a company is able to find a researcher/institute able to develop the desired knowledge, there are still many factors which determine whether or not that research will actually take place.[28]
  - Scheduling and organising research depends on many factors (such as larger research programmes, fundamental questions, societal benefit, personal drivers, or funding). A 'knowledge request' from a company is just one extra factor in that mix. Whether or not there is scope to do anything with that request will depend on things such as the nature of the institute or the type of research/knowledge involved.

27. At European level (including via the European Open Science Cloud),via national policy and also locally (e.g. Https://openresearch.amsterdam), efforts are currently under way to increase *open access,* but more will be needed than *open access* alone to make knowledge genuinely findable and usable (cf. *Dare to share* (Adviesraad voor wetenschap, technologie en innovatie 2016a)).
28. Several entrepreneurs that we spoke to found that it is difficult in practice to get research on the most relevant knowledge needs placed on the agenda.

- The working methods and incentives for research will also be different in a knowledge institute from in industry; while it is logical that these differences exist, in practice they do present an additional obstacle for companies in finding the right knowledge. For example, the emphasis in the scientific culture has traditionally been on publishing in scientific journals and on winning (academic) research projects, and those are accordingly the criteria on which most researchers are initially assessed. This reduces the incentive for researchers to be inspired directly by a knowledge request from a company. Yet there is scope for change here: a movement is currently under way to 'acknowledge and value' staff of knowledge institutes in a more differentiated way and on more aspects.[29]

- Smaller and less innovative companies, in particular, find it difficult to articulate their knowledge needs;[30] these companies would be helped by mechanisms for demand pooling and articulation, but these are (almost) non-existent.
  - A good practice from the past were the agricultural product boards, but these no longer exist. Other intermediary structures (such as Syntens) have also been abolished.
  - The structures that have replaced them (such as the Top Sectors or regional deals) have proved not to be equally suitable for all parties, or not yet sufficiently developed.

'Push': (useful) knowledge not yet finding its way to companies optimally

Some of the knowledge developed by Dutch knowledge institutes already finds its way to society and businesses, but there is definitely scope to achieve greater (societal) impact. Knowledge institutes, such as universities of applied sciences, universities and applied research institutes, have an important, broad responsibility for maintaining and strengthening the knowledge infrastructure in the Netherlands. Some of the knowledge they develop will find its way to society via entrepreneurship. How successful are the attempts to make this knowledge available to companies? This is about the 'push' of knowledge from knowledge institutes to companies (in some cases already involved in the research, as with spin-offs,[31] for example).

29. See VSNU et al (2019)
30. See also the final evaluation of the valorisation programme (*Eindevaluatie valorisatieprogramma*) by Dialogic (Janssen et al. 2018).
31. For the knowledge pathway for knowledge-intensive start-ups, see the report *A better start* (Adviesraad voor wetenschap, technologie en innovatie 2020).

From our analysis and the interviews, we observe that access to the knowledge that is developed could be improved to facilitate possible further development or applications.[32] Our main observations:

- Several interviewees referred to the culture within knowledge institutes (particularly universities): in the view of the interviewees, the emphasis is heavily on disseminating the results within the discipline, while the (transition to) valorisation carries lower status because traditionally universities are rated mainly on the number of publications and research projects won. Efforts are now however under way to devise a broader approach to rating the performance of researchers, including in the area of valorisation.[33]
- One valorisation activity which is currently (too) uncommon is participation by researchers from public knowledge institutes in the committees which draw up standards. This is because participating in such a committee generally costs money, while the rating accorded to a researcher within their knowledge institute for this participation is often (still) limited. This hinders the incorporation of the latest (scientific) insights into new standards, and means an opportunity is being missed to ensure that this knowledge reaches companies via standards.
- KU Leuven is regarded as a successful example of a university where valorisation is more embedded in the 'DNA' of the institute and its researchers. This is the result of a process spanning several years of building a culture and structure for valorisation.
- Although the support for knowledge/technology transfer has grown at Dutch knowledge institutes, there is still only limited capacity for effectively carrying out activities such as 'scouting' within knowledge institutes for knowledge that can be put to good use.
- Given this limited capacity, there is a danger that knowledge that can be protected receives the most attention, so that the valorisation of 'open' 'knowledge is pushed to a lesser extent, even though its societal impact can be considerable.
- Recently, a number of initiatives have emerged in various quarters aimed at making 'knowledge' more transparent for companies and others; examples include the 'Science Finder'[34] or 'knowledge transfer offices' via ScoutinScience[35] (this helps the knowledge transfer offices to find potentially usable knowledge among the whole body of research output).

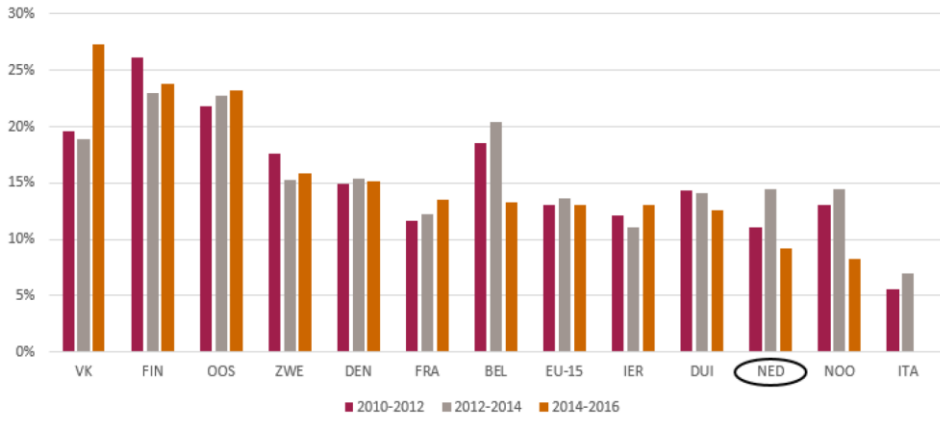
32. AWTI has referred to this previously in the report *Dare to share* (Adviesraad voor wetenschap, technologie en innovatie 2016a).
33. See VSNU et al.(2019)
34. https://sciencefinder.techleap.nl/
35. https://www.scoutinscience.com/

2.3 Collaboration between knowledge institutes and companies could be more frequent and more effective

Companies and knowledge institutes collaborate in various ways. This collaboration can be very valuable for developments on both sides. Knowledge institutes and companies do of course each have their own 'logic' (what is their goal? How do they work?). Taking careful account of each other's logic can make the collaboration more effective. There is also undoubtedly still scope for more frequent collaboration.

Currently, for example, only one in ten innovative companies collaborate with a university, and just one in 20 work with a public research institute, according to research by Rathenau Instituut (see Figure 5).[36] These percentages are lower than in the past and also lag well behind those in other countries such as the United Kingdom, Finland or Belgium.[37] The share of less innovative companies collaborating with these types of knowledge institute is undoubtedly even lower.

Collaboration with higher education institutes



36. See Koens et al. (Koens et al. 2020).
37. See also the Community Innovation Survey from Eurostat.

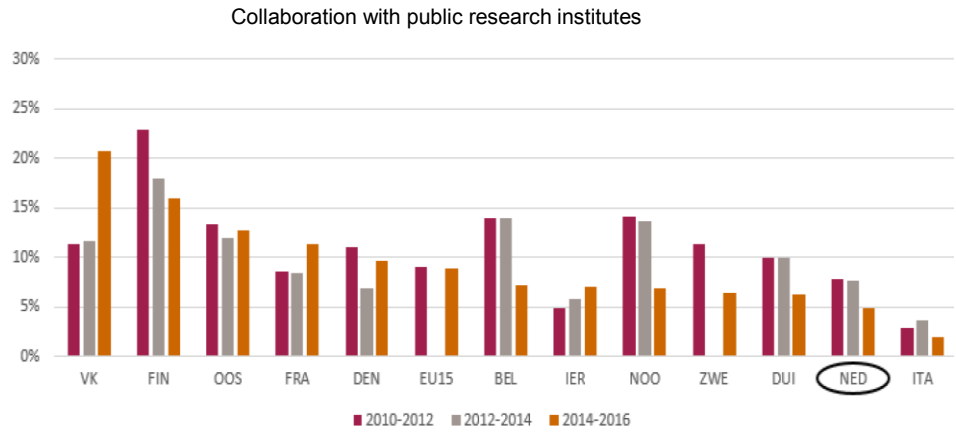


Figure 5 Percentage of innovative companies collaborating with higher education institutes (top) or public research institutes (bottom)
(Source: Rathenau Instituut, 'Balans van de wetenschap 2020'*)*

Intensive collaboration mainly takes place with large companies

Collaboration between knowledge institutes and companies in the form of joint research and development mainly takes place with larger companies that are already innovative, for example taking the form of strategic research partnerships between knowledge institutes and these companies (e.g. QuTech of ArcNL).[38] Collaboration also takes place between (innovative) companies and knowledge institutes within structures such as the 'Top Sectors'.

SMEs are in danger of missing the boat

It is generally acknowledged that small and medium-sized companies in particular, and especially the low and medium-innovative companies in that category, along with 'newcomers', find it very difficult to connect with knowledge institutes and their knowledge development.[39] The barriers include:

- Schemes to promote collaboration between knowledge institutes and companies often involve all kinds of administrative requirements and red tape which are a burden for SMEs.

38. See also Rathenau Instituut (2018), *Bedrijf zoekt universiteit. De opkomst van strategische publiek-private partnerships in onderzoek.(Sue-Yen Tjong Tjin Tai et al. 2018)*
39. Government strategy 'Versterken van onderzoeks- en innovatie-ecosystemen', p. 14. "Ecosystems failing to adequately […] connect with small and medium-sized companies […] to transfer knowledge', with reference to Dialogic (2018). See also: Commissie Van Saarloos (2021).

- For less innovative companies, a scheme to promote knowledge-sharing is often not enough on its own: in reality, the company's need for knowledge must already have been identified in some other way, after which the scheme can act as a 'flywheel' to accelerate the process.
- Less innovative companies often do not have the right contacts in the 'knowledge world', or do not have the right people within the company to absorb the new knowledge.[40]
- SMEs find it difficult to access applied research institutes,[41] but also universities.[42] This is perceived by those involved as a 'stubborn problem'. The reasons for this are:[43]
  - The fact that many SME entrepreneurs are not fully aware of what significance knowledge institutes can have for them ('unfamiliarity');
  - The cultural differences between the hands-on mentality of many SME entrepreneurs on the one hand and the research approach by applied research institutes (TO2 institutes) and researchers on the other.
  - The fact that SME entrepreneurs are scared off by the costs that knowledge institutes (have to) charge, especially if those SME entrepreneurs have not yet experienced the (potential) benefits of acquiring knowledge from these institutes.
- Certain intermediary structures which existed in the past have disappeared or been abolished, while small or new players find it difficult to (help) set the agenda in new structures such as the 'Top Sectors'.[44] These smaller companies are accordingly less able to put their stamp on research and development within a Top Sector, for example.
- There are other pathways that SMEs can follow for knowledge-sharing, but their effectiveness leaves room for improvement. Examples are bringing in knowledge via new employees (graduates) or graduation internships. These forms of knowledge-sharing via people are discussed in more detail in the next section.

Together in one location: a first step, but more is needed

Increasing efforts have been made in recent years to bring together companies and knowledge institutes in a single region or even at the same location. There are now

40. This also touches on the risks of capture, insider-outsider problems with development and implementation of the policy. See: TNO (2018), *De staat van Nederland innovatieland,* Ch 2 and 5.
41. Specifically for the TO2 institutes: Commissie Van Saarloos (2021:36).
42. This emerged in several interviews that we conducted for this report.
43. Commissie Van Saarloos (2021:36).
44. New intermediary structures are now emerging again at regional level, such as the 'first-line organisation' as part of the Samenwerkingsverband Noord-Nederland collaborative structure.

around 35 campuses where knowledge institutes and companies are in close physical proximity.[45] But other forms of shared facilities are also growing. For example, a network of 43 'field labs' has been set up since 2015 through the 'Smart Industry' programme. An evaluation of the functioning and funding of these field labs was published in the spring of 2021.[46] The conclusion was that the 'Smart Industry' programme has contributed to awareness-raising and agenda-setting, but that the results are (still) limited as regards actually mobilising individual companies and taking steps in the Smart Industry transformations. Ultimately, only a relatively limited group of companies was reached, and the activities did not always align with the reality of the 'broad SME sector'. It is mainly (more) innovative companies which link up with the field labs.

Other relevant points to emerge from the literature and our interviews include the following:

- The fact that a knowledge institute and businesses are located in close proximity is not enough on its own to spark collaboration; it is a first step.
- People or structures are needed to create genuine links between knowledge (institutes) and companies, for example specific joint activities or 'brokers' who are able to bring the two sides together (among other things by speaking the language of the entrepreneur). Even then, however, the follow-up remains a concern.
- Where a shared location works well, it can act as a magnet both for talent and for other companies or knowledge institutes. Examples cited in our interviews include the High Tech Campus in Eindhoven, Leiden Bio Science Park, the Wageningen Campus or, on a smaller scale, some field labs.

2.4 Too little attention for people as carriers of knowledge

In practice, sharing knowledge via people is an important route by which a certain 'state-of-the-art' level of knowledge can reach companies,[47] but too little attention is given to this route in policy on knowledge-sharing.

People who come straight from a knowledge institute (e.g. graduates or those having just obtained a doctorate) and start working at a company contribute to raising the level of knowledge within that company, strengthening its knowledge absorption capacity and broadening the company's network by establishing new links for knowledge-sharing. This route also offers possibilities for developing new knowledge or practices, for example through graduates who complete their internship within a company, or other forms of joint

45. For a more detailed discussion, see: Buck Consultants (2018).
46. Dialogic (2021), *Evaluatie Smart Industry programma* (Grond et al. 2021).
47. See *Managing the Flow of Technology* (Allen 1995).

research, such as a company employee who carries out doctoral research in collaboration with a knowledge institute.

Each year around 70,000 students graduate from Dutch universities of applied sciences, and tens of thousands of university students complete external internships each year. Numerically, therefore, there are many opportunities for knowledge transfer – and not just to highly innovative companies, but also and particularly to less innovative businesses, including many SMEs. Yet these pathways are almost ignored in practice from the perspective of 'knowledge transfer'. There is thus much to be gained here. What we have here is a multitude of existing contacts between knowledge institutes and companies (including many less innovative companies); it ought to be possible for these contacts to achieve more effective knowledge-sharing. Problems which currently occur (according to our interviewees) are as follows:

- It is not always easy for companies to find the right discipline, student and supervisor for an internship. This makes it less likely that the company will bring in the 'right' knowledge.
- There is often little or no attention for 'follow-up' of a (graduation) internship ('who is going to implement it?').
- If the company does implement the improvement, this innovation often remains stuck in that one company, so other companies do not readily benefit.

Good examples that we encountered include the following:

- The innovation work placements in the north of the Netherlands (by Hanze University of Applied Sciences). Key features are that companies become 'members' and that there is a broker who links the knowledge needs of companies with the right students/supervisors. One point for attention is that this broker's function is a structural role, yet there is no structural funding for these brokers.[48]

Delft University of Technology (TU Delft) has a number of field labs (such as the RoboHouse or the Green Village) where undergraduate and postgraduate students work on projects together with companies. Here again, however, structural funding is needed from the knowledge institute to provide basic finance for the field labs.

Dual roles

As well as graduates or researchers who go to work or complete a temporary internship at a company, 'dual roles' where someone simultaneously works at a company and a knowledge institute are another effective means of sharing knowledge. A researcher at a

48. See *Higher education for Smart Specialisation. The Case of the Northern Netherlands* (Paul Benneworth en Eskame Arregui-Pabollet 2021).

knowledge institute will gain a broader perspective if they also operate within a company. Conversely, someone with experience of working at a company will bring to bear new questions and experience, for example regarding continued development of the knowledge or innovation within the knowledge institute. These dual roles thus guarantee continuous knowledge-sharing and are a structural form of sharing knowledge between the knowledge institutes and the company. A reasonably common construction is one where larger, innovative companies employ one or more part-time professors. Our impression is that dual roles of this kind are less common in the SME sector (in relation to universities of applied science or otherwise), which means there is clearly untapped potential for knowledge-sharing here.

Human capital agenda and innovation agenda are interrelated

Given the major role played by qualified individuals in the knowledge transfer that is needed to keep businesses innovative and, preferably, make them more innovative, it is vital that the human capital agenda and (policy for) knowledge transfer are closely linked.[49] There are some Dutch regions where a majority of SMEs say they have difficulty in absorbing new knowledge.[50] These companies are also hindered by shortages of qualified staff or mismatches in terms of training.[51] In senior secondary vocational education, there is regional consultation between knowledge institutes and industry on the required training programmes, but in higher professional education (universities of applied sciences) or academic education (universities), this regional coordination is absent.[52] The mismatches which are partly the result of this also help ensure that the knowledge-sharing between knowledge institutes and companies is less than optimal.

2.5 Current knowledge transfer policy is incomplete and too fragmented

The toolkit of instruments to promote knowledge-sharing between knowledge institutes and companies is fragmented and incomplete. This was also the government's conclusion in a recent policy document.[53] An earlier pilot study by the European Commission concluded that the Dutch policy for knowledge transfer is generic, highly

49. See also e.g.: Benneworth & Arregui-Pabollet (2021:4)
50. See Vankan et al. (2020).
51. Refer to analysis in *Shaking up the system* (Adviesraad voor wetenschap, technologie en innovatie 2019).
52. An example of this regional consultation is the 'Manifesto on work and development in North Holand 2030' (*Manifest Werken en ontwikkelen 2030 Noord-Holland*), to which the University of Amsterdam (UvA) and VU University Amsterdam are set to sign up in the coming period.
53. Government strategy 'Versterken van onderzoeks- en innovatie-ecosystemen' (2020).

diverse and (too) fragmented.[54] Knowledge-sharing is often no more than an implicit part of the relevant policy, with the policy or funding focusing for example mainly on establishing the 'conditions' for sharing (such as developing a campus), but not on actually bringing the parties together (this requires additional measures, as indicated above). Or the policy tries to promote innovation in general (for example through the R&D tax credit (WBSO)), but without focusing specifically on improving the sharing of knowledge between companies and knowledge institutes or generating the desired innovation(s). As a result, the policy is not sufficiently focused on the differentiated needs within industry, geared to the level of innovation within companies. The recent government strategy on strengthening research and innovation ecosystems also makes clear that the policy in relation to knowledge-sharing is very fragmented, with a great many different rules and regulations and funding instruments, each of which in turn has its own regime.

There are however some schemes which are aimed specifically at knowledge transfer:

- Thematic Technology Transfer (a continuation of a small part of the valorisation programme, but along a different pathway, starting from predefined themes).
- SME digitalisation work placements (this stems from the SME Action Plan).
- Within the Top Sectors approach, there is a 'knowledge vouchers' scheme which is intended to encourage innovation in the SME sector in particular.
- The European Regional Development Fund (ERDF) is also being deployed (to some extent) in the Netherlands to promote innovation in the SME sector.

Another problem already highlighted above is the lack of clarity about what 'we' as Dutch society expect from the different types of knowledge institute in terms of valorisation, and in particular (for this report): knowledge-sharing with companies as a specific part of that. AWTI has made this same observation previously.[55] The government is currently not taking any steps to create more clarity here.[56] This lack of clarity acts as an obstacle in practice to setting up a clear and supported valorisation policy within knowledge institutes and building the necessary structures to support it.

54. See Sanz-Menéndez & Cruz-Castro (2020) In the same sentence: Benneworth & Arregui-Pabollet (2021).
55. See *Shaking up the system.* (Adviesraad voor wetenschap, technologie en innovatie 2019)
56. See Kamerstukken II 2020-2021, 33 009, nr. 99, p. 5.

2.6 Conclusion: underutilised knowledge transfer pathways and problems for medium innovative and low innovative companies

A smoothly functioning system of knowledge-sharing between knowledge institutes and businesses is crucial to continue feeding innovation within those companies, as well as forming a good source of inspiration for research. It is necessary in order to keep the Dutch economy healthy and contributes to solutions to the societal challenges facing us. The main general conclusions from our analysis are:

- Take a differentiated view of knowledge-sharing between knowledge institutes and companies, both in terms of expectations and suitable pathways. This will contribute to policy effectiveness.
- Make it easier for knowledge institutes and businesses to connect. Making knowledge findable and easily accessible remains a point of concern, as does selecting (within knowledge institutes) the knowledge that can be applied by external parties. The 'knowledge desk' function needs to be improved further.
- The different prevailing logics are a point of concern in the collaboration between knowledge institutes and companies: these differences are understandable (and legitimate), but do make collaboration more complex.

If we look more closely at the different knowledge pathways in relation to the different groups of companies (highly, medium-low innovative), we find the picture set out below. Based on our analysis, we have estimated which of the typically relevant knowledge pathways already work well and those where much of the potential has not yet been reached (see Figures 2, 3 and 4). More details can be found in the table in Annex 1, but the result is set out in Figures 6, 7 and 8 below. Knowledge pathways with clear improvement potential are marked in dark red, while those which already work well are shown in green. The knowledge pathways which are somewhere between these two are shown in orange.

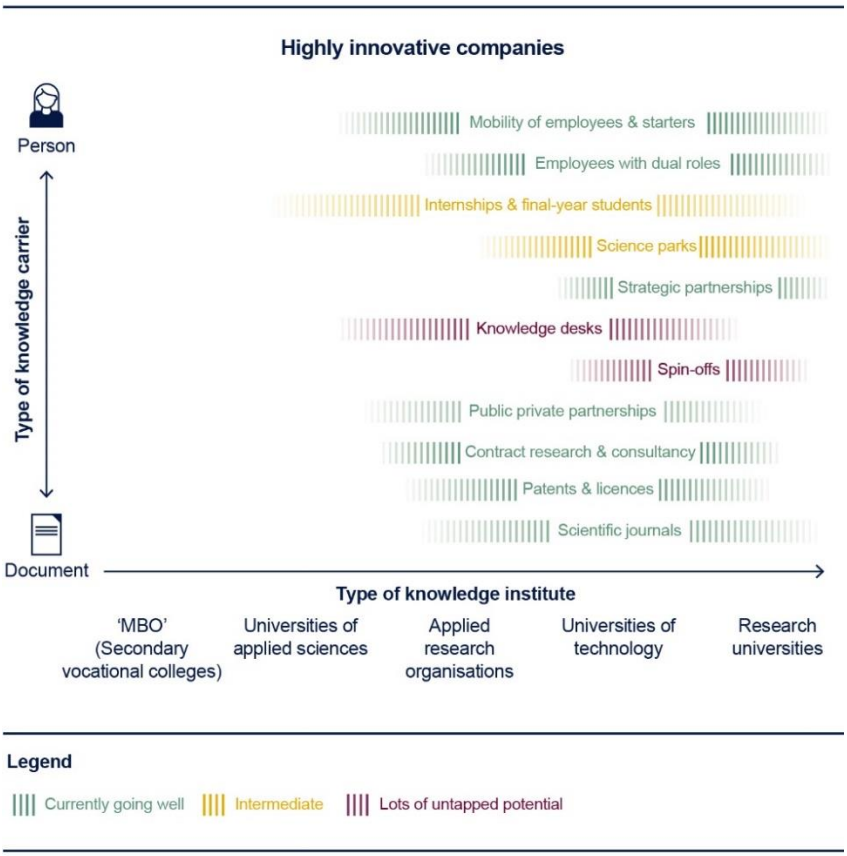


Figure 6 Utilisation of knowledge pathways for highly innovative companies

- People as carriers of knowledge are an underutilised route for knowledge-sharing. There is lots of potential here, because the numbers are large (both at universities of applied sciences and universities) and because large numbers of less innovative companies are reached. The quality of these pathways as a form of knowledge-sharing does need to be raised. Successful examples (e.g. dual roles between university and innovative company) could also be expanded to other 'fields' (e.g. between universities of applied sciences and medium-innovative companies). Our estimate is that medium-and low innovative companies, in particular, would benefit greatly from this (see Figures 7 and 8).

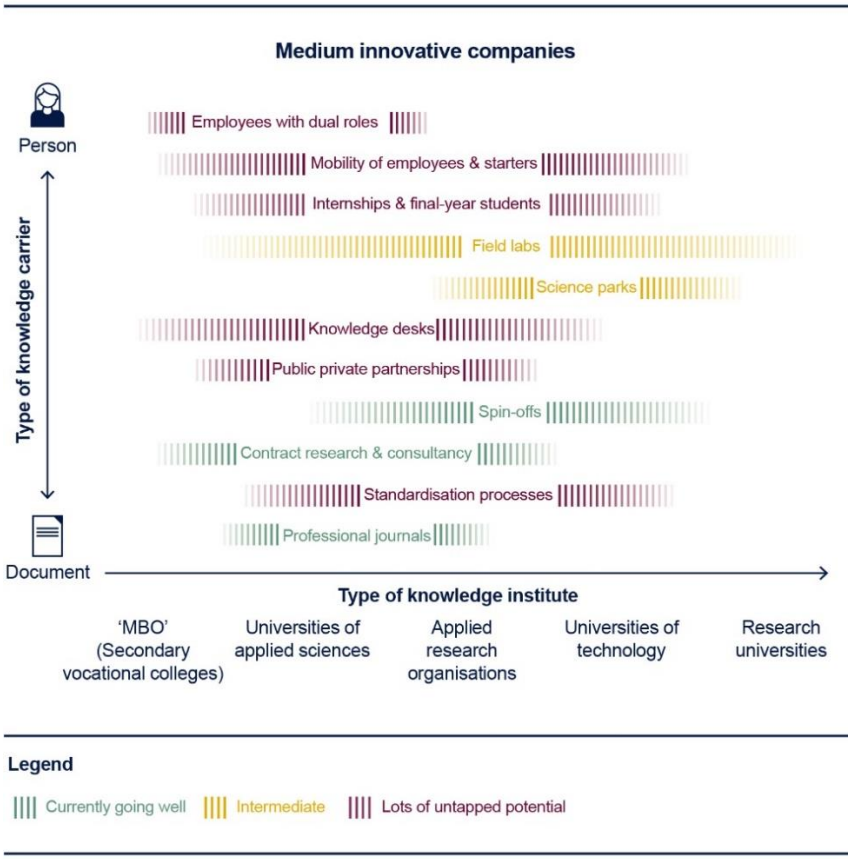


Figure 7 Utilisation of knowledge pathways for medium-innovative companies

- Major efforts have been made in recent years directed at co-location (campuses, etc.), but this does not automatically lead to collaboration; supplementary policy/activities are needed. We therefore rate the success of field labs and science parks as 'average'.
- The potential of standardisation projects is not yet been sufficiently exploited because the researchers with the latest knowledge are often not (yet) involved. This mainly impacts on knowledge transfer to medium-and low innovative companies.

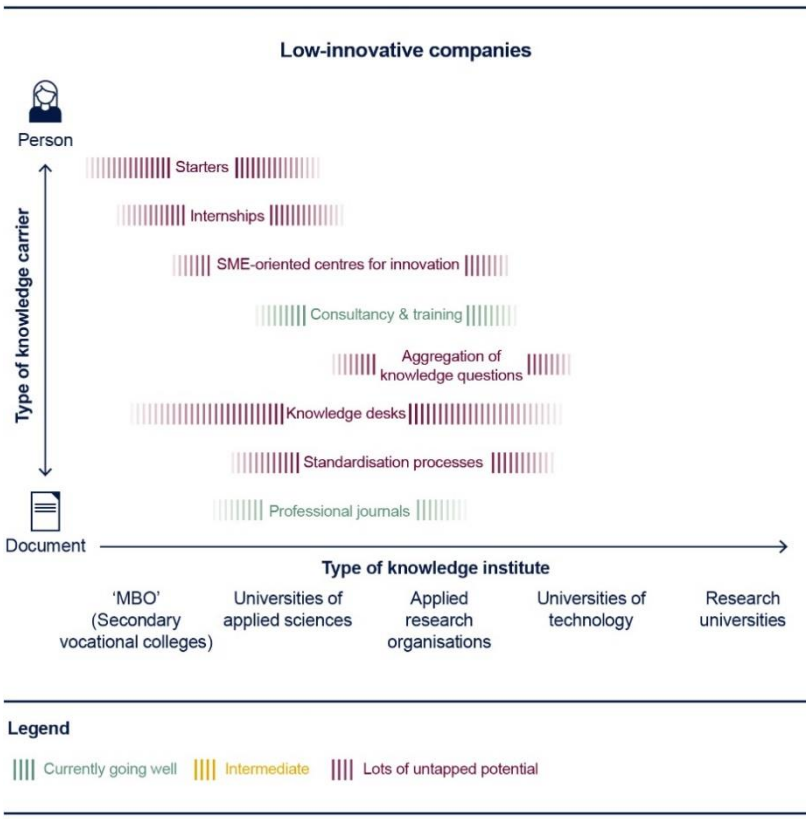


Figure 8 Utilisation of knowledge pathways for low-innovative companies

- The SME sector, in particular, is missing the boat in terms of collaboration. These companies have fewer resources available for agenda-setting and actual research collaboration, while many of the intermediary structures have been dismantled, and new structures or instruments are not able to compensate adequately. As a result, these companies are not sufficiently able to connect to public-private research partnerships (PPP). Moreover, precisely these companies have a need for mechanisms for demand pooling and articulation, but in practice these mechanisms are generally too thin on the ground. Connections within the SME sector through peer exchange and peer learning could also contribute to the sharing and application of knowledge within these companies.

The recommendations in Chapter 3 will focus mainly on the 'orange' knowledge pathways, because in our view this is where there is scope for improvement which will have a noticeable effect.

3

Recommendations

Knowledge-sharing between knowledge institutes and companies could be made more efficient if policy took account of the wide variety of ways in which knowledge flows and investing in those forms of knowledge-sharing which are insufficiently utilised at present. First, it is key to ensure that those on the supply and demand side of the knowledge 'market' are able to connect in different ways, more often and better. Second, more attention must be given to the transfer of knowledge via people; there is lots of untapped potential here. Third, knowledge institutes must be given the freedom to treat valorisation as customisation, with adequate professional support. That is also an important condition for more effective knowledge-sharing. The proposed improvements will enable more companies, equipped with the most recent insights from research, to grasp more opportunities. That in turn will contribute to resolving societal challenges and promote the growth of broad prosperity.

This chapter makes recommendations for how AWTI believes the above three issues should be approached.

It starts with attention for how the various parties in the ecosystem are able to **connect** with each other. AWTI recommends that measures be taken on the side of both knowledge institutes and companies to ensure that they are able to connect with each other better. For knowledge institutes, the key is to make the enormous flow of knowledge they develop easier to find. For companies, it is about demand pooling and support in articulating their knowledge needs. AWTI also stresses the importance of different kinds of collaboration, appropriate to the nature of the particular knowledge institute and the company.

Regarding the second theme, AWTI focuses attention on what really lies at the heart of knowledge transfer: **people** make the difference. Students and graduates – in large numbers – bridge the boundaries between knowledge institutes and businesses. But researchers and company employees can also build such bridges; as carriers of knowledge, they are crucial for its transfer. AWTI therefore recommends that this 'route' be deployed as well as possible for knowledge transfer. An additional advantage is that this will help particularly to reach many low-innovative companies. AWTI also recommends increasing the mobility of employees between knowledge institutes and companies, with attention for innovation and entrepreneurship.

As a condition for this, AWTI believes it is also necessary to accommodate differentiation as regards **valorisation**. Knowledge institutes need to be free to employ those valorisation activities which match their profile; this customisation will make valorisation

efforts more effective than if every institute is forced to apply the same, generic valorisation model.

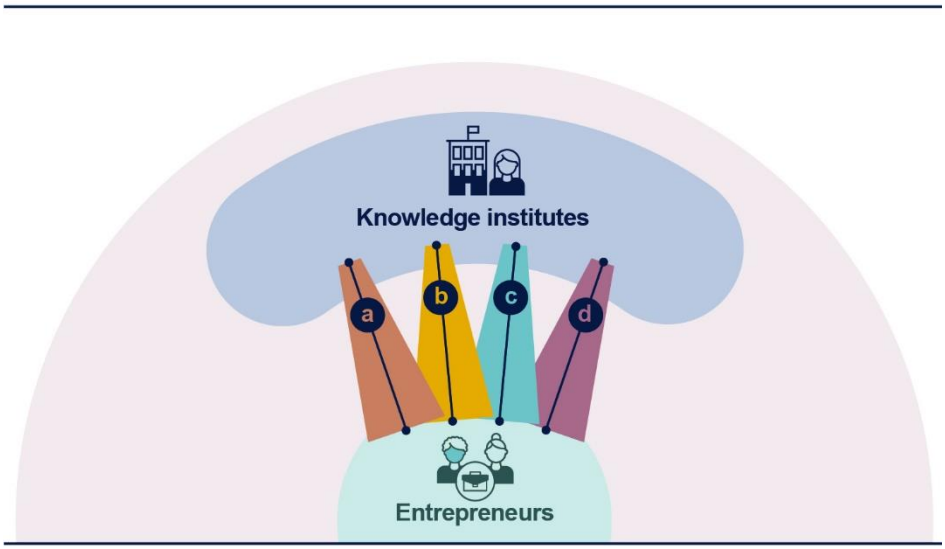


Figure 9 Recommendation 1: Strengthen the links between researchers and entrepreneurs

(a, b, c, d refer to the partial recommendations)

3.1 Recommendation 1: Strengthen the links between researchers and entrepreneurs

Strengthen the links between researchers and entrepreneurs

A first important step to improve the knowledge exchange between researchers and entrepreneurs is that both 'worlds' find each other more easily and more often and that they collaborate more effectively. To this end, we make four (partial) recommendations (a, b, c, and d), each of which forms a 'bridge' between entrepreneurs and knowledge institutes. This is shown in Figure 9. The four bridges are – in short:

a) Make knowledge better accessible (i.e. findable and understandable) for non-scientists

b) Strengthen the connectivity between knowledge institutes and companies

c) Improve the matching between the knowledge needs of entrepreneurs and researchers

d) Encourage collaboration between researchers and entrepreneurs

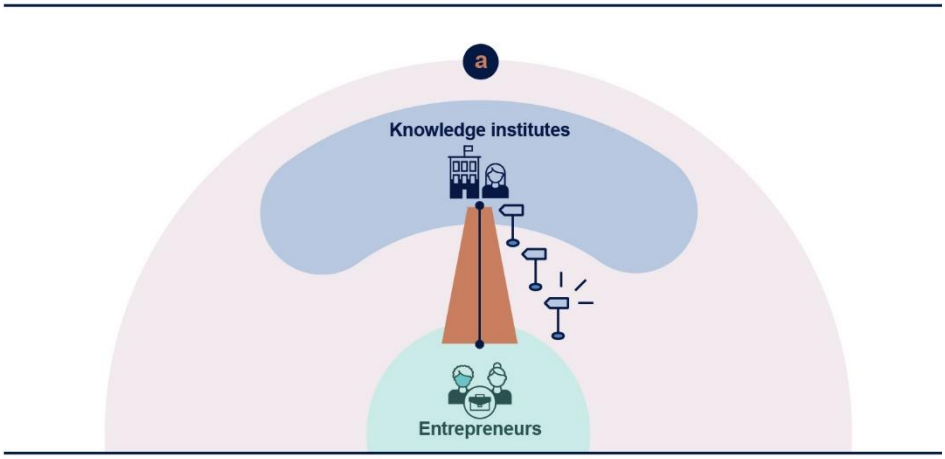


Figure 10 Recommendation 1a: Make knowledge better accessible (i.e. findable and understandable) for non-scientists

1a) Make it easier to find knowledge from knowledge institutes: make the available knowledge broadly accessible, understandable and findable.[57]

- ▷ Findability starts with a clear profile: identify focus areas and make them visible and understandable. This needs to happen at the level of individual institutes.[58] However, if different kinds of knowledge institutes work together thematically and 'in the chain' in recognisable consortia, this also increases the visibility and findability of knowledge for companies.
- ▷ Knowledge institutes must work on making their knowledge accessible, using vehicles such as Science Finder or ScoutinScience in combination with developments such as open access.[59]
- ▷ Make it easier for companies to 'shop' for promising ideas within knowledge institutes in order to make practical use of that knowledge (improve the 'knowledge desk' function). Support this by strengthening dedicated business development at knowledge institutes.

57. Cf. AWTI report on *open science: 'Dare to share. Open access and data sharing in science'* (Adviesraad voor wetenschap, technologie en innovatie 2016a).
58. As AWTI has previously advised in *'Shaking up the system.* Towards a future-proof higher education and research system*'* (Adviesraad voor wetenschap, technologie en innovatie 2019).
59. With a role for the VSNU, for example, in collaboration with the other umbrella organisations?

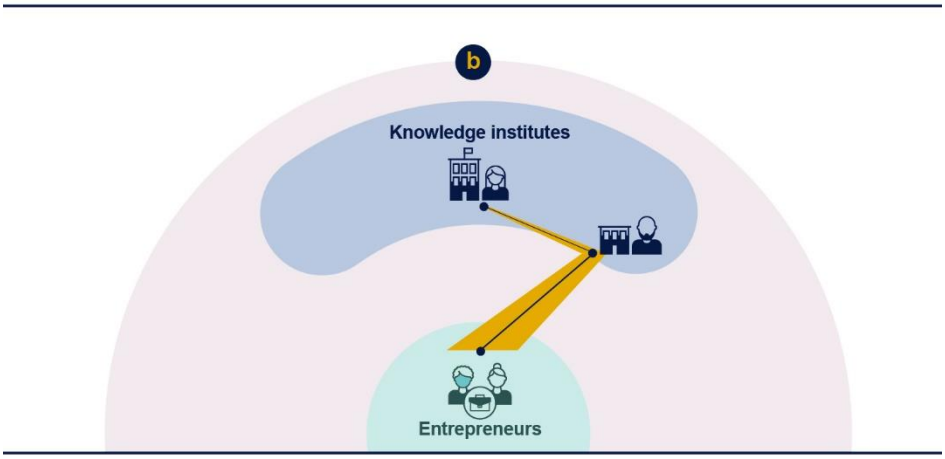


Figure 11 Recommendation 1b: Strenghten the connectivity between knowledge institutes and companies

1b) Strengthen the 'connectivity' between knowledge institutes and companies

- ▷ Encourage more intensive collaboration in the 'chain' of fundamental, applied and practical research. This will enable new knowledge to reach companies via a number of 'natural' links, which is likely to improve the match between what is offered and what is needed. The current major societal challenges demand this approach, and a link is therefore needed to policy aimed at tackling those challenges, so that general policy and innovation collaboration effectively reinforce each other.[60] Institutes of applied research and universities of applied sciences are an important link in making the connection with companies.[61] The Netherlands needs to choose a few priority areas in which it wishes to play a leading role, and to scour the globe for (knowledge) development with a view to bringing it to the Netherlands.

60. Cf.: *Grasp the challenge, shape the future* (Adviesraad voor wetenschap, technologie en innovatie 2016b) and *Vital links* (Adviesraad voor wetenschap, technologie en innovatie 2017).
61. A good example is Wageningen University & Research (WUR), which is a merger between a number of research institutes and the university.

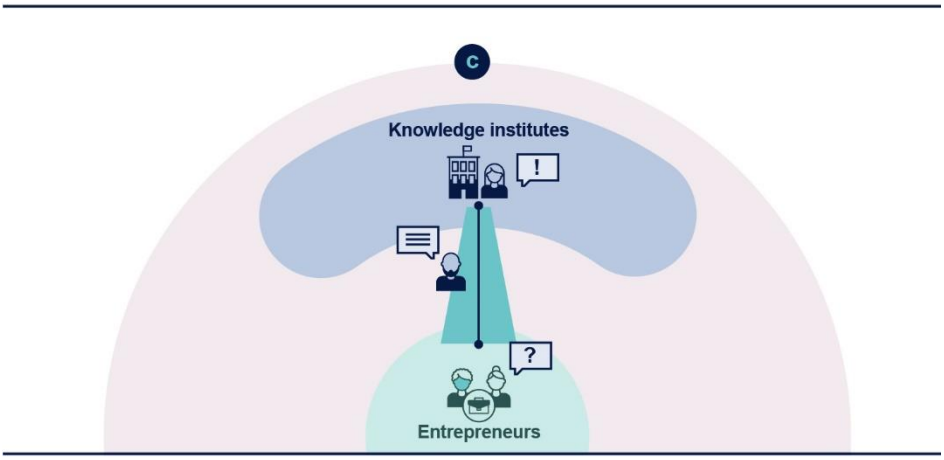


Figure 12 Recommendation 1c: Improve the matching between the knowledge needs of entrepreneurs and researchers

1c) Help companies articulate their knowledge needs better and improve the match with knowledge institutes. Devote special attention to SMEs and 'newcomers'.

- ▷ Help small and medium-sized businesses to articulate their need for knowledge by providing sufficient 'knowledge brokers', particularly for the SME sector. These 'brokers' can work from the basis of existing structures (for example by ensuring that knowledge transfer offices have a dedicated person briefed with maintaining this relationship with the SME sector or acting as a 'translator' of SME knowledge needs,[62] or build new structures for knowledge-sharing with the SME sector.[63] Where there is collaboration, ensure a good match between the practical needs of companies and the research questions studied by students and researchers. This will ensure that the needs of SMEs and other low or medium-innovative companies reach the right knowledge institutes more effectively.
- ▷ Make it easier to join and/or leave collaborative partnerships of knowledge institutes and companies. This is particularly crucial for SMEs. However, it is important to avoid free-riding, for example by introducing a standard

62. Cf. the recommendation by the Commissie Van Saarloos (2021), p. 7.
63. The regional cooperatives in Groningen which were formed for the 'innovation work placements' are an example.

intellectual property system and by requiring a contribution to earlier research ('backward fee') from later entrants.

- In sectors with a high proportion of SMEs, demand pooling can ensure that the relevant practical knowledge needs of businesses find their way to researchers. Ensure that seed money is available to set up and carry out the initial research on knowledge needs which are broadly shared in a given sector. Companies can then step in at a later stage (possibly one-to-one) for the further development or application. (The seed money is needed because in many cases there are no suitable structures for pooling questions from companies and jointly funding the research). Innovation 'leaders' can form a link to challenge other companies in the 'chain' to innovate (for example by setting requirements for their suppliers).

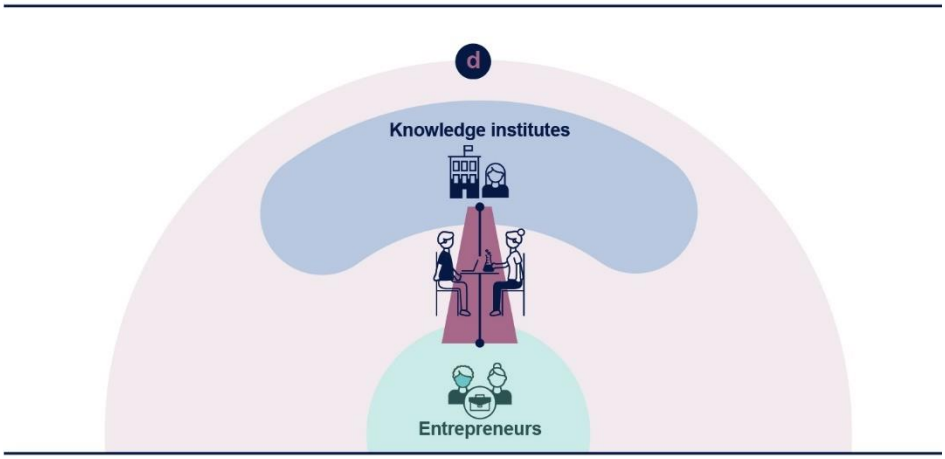


Figure 13 Recommendation 1d: Encourage collaboration between researchers and entrepreneurs

1d) Encourage collaboration between researchers and entrepreneurs

- Encourage the setting up of a joint research and development agenda between companies and knowledge institutes.[64] Examples are strategic research partnerships (such as QuTech), the 'knowledge and innovation agendas' of the Top Sectors and, more recently, regional knowledge and innovation agendas (such as the Growth Agenda (*Groeiagenda*) in Zuid-

64. For example with a view to societal challenges. AWTI has previously argued in this context for mission-based innovation.

Holland).[65] Special attention must be given here to including SMEs and 'newcomers'. Linking such agendas to societal challenges will make innovation more effective.

- ▷ Facilitate intensive collaboration via co-location and co-creation (e.g. science parks, innovation work placements and field labs). Be alert to the following here:
  - In the case of science parks, additional efforts are needed to realise actual connections, for example organising (targeted) meetings and other activities.
  - Innovation work placements with lots of SMEs require brokers to ensure the correct match (this is a 'structural' role, which demands structural funding) and to help with demand articulation.
  - Shared facilities (e.g. field labs) are useful for companies, but often also require structural (additional) funding.

There is a clear role here for universities of applied sciences, which are more embedded in the various regions and have better links with the SME sector, potentially leading to more concentrated societal impact.

3.2 Recommendation 2: Facilitate the sharing of knowledge by people

Facilitate the sharing of knowledge by people

- ► **Promote cross-fertilisation through dual roles**
  - ▷ Encourage collaboration through dual appointments, where one and the same person works at a knowledge institute and a company. For researchers from knowledge institutes, a part-time role within a company broadens their perspective of knowledge development. The reverse route also occurs, for example in the form of part-time professors drawn from industry (often larger companies), but this route requires a further impulse to increase the focus on smaller and medium-sized companies (in combination with universities of applied sciences).

65. https://www.zuid-holland.nl/onderwerpen/economie/groeiagenda-zuid-holland/

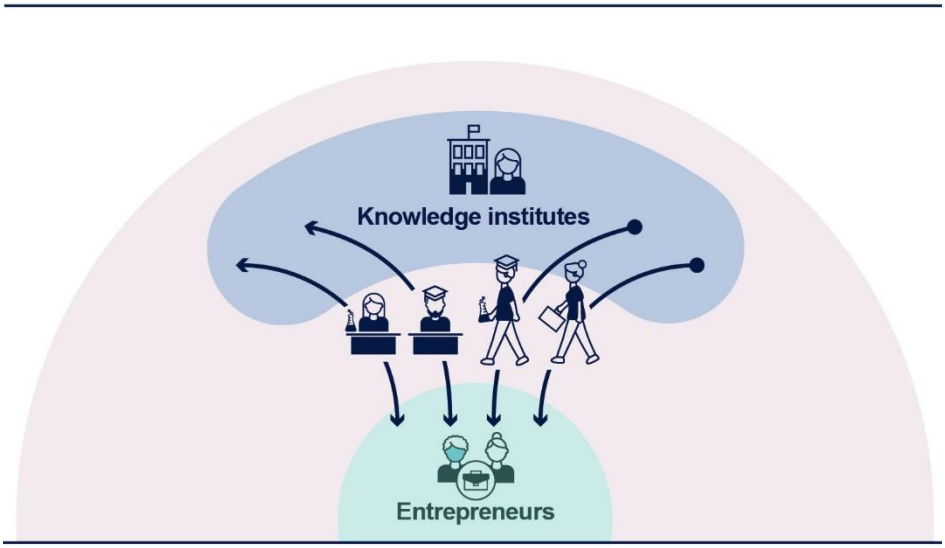


Figure 14 Recommendation 2: Facilitate the sharing of knowledge by people

- ▷ Make it attractive for people to switch (temporarily) between working at a knowledge institute and in industry. Previous initiatives such as the Casimir scheme, where researchers from knowledge institutes could be temporarily seconded to a company or, conversely, researchers from a company could spend time working at a knowledge institute, can serve as an example here.

► **Make more effective use of internships and graduation for knowledge-sharing between knowledge institutes and companies.**

- ▷ Ensure that the 'broker function' between companies (especially SMEs) and higher education institutes is functioning adequately, so that the practical needs of companies are matched to the right discipline in terms of student and supervisor. This will also improve the relevant 'knowledge network' of the entrepreneurs involved and their companies.

► **Be aware of the key role played in knowledge transfer by graduates or researchers who go on to work in a company.**

- ▷ Ensure that sufficient people are trained in those disciplines which are in demand by companies.[66] Link the human capital agenda to the policy on

66. At present, higher education is not delivering the right mix of graduates.(Adviesraad voor wetenschap, technologie en innovatie 2019:24)

knowledge transfer. Have higher education institutes work together to organise a training offer which matches the needs of society and the economy, where possible with special attention for the regional circumstances.[67]

Stimulate the potential for knowledge transfer by students and graduates, for example through a combination of an internship followed by a job within the company in order to prolong the results of the internship. An 'innovation traineeship' scheme recently set up as a pilot to improve the knowledge-sharing between universities of applied sciences and SMEs looks promising.[68]

3.3 Recommendation 3: Encourage customised valorisation with professional support

Encourage customised valorisation with professional support. Ensure that knowledge institutes have sufficient possibilities for this.

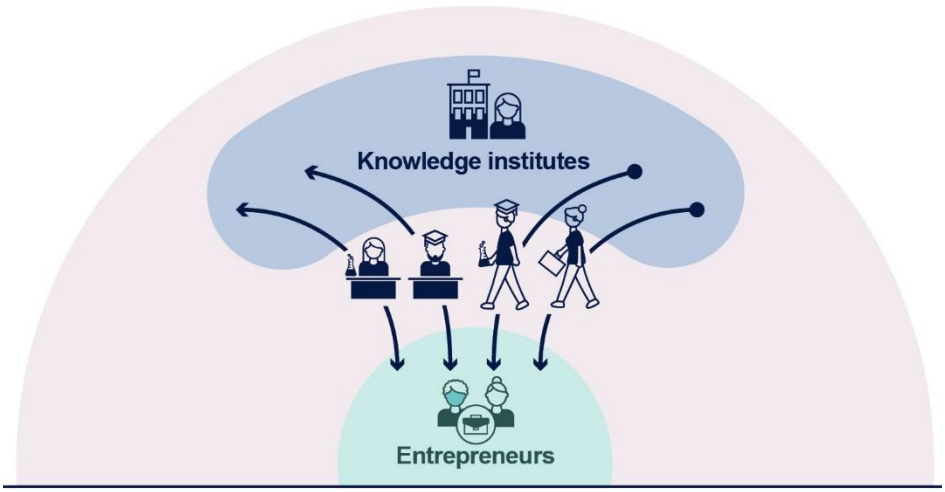


Figure 15 Recommendation 3: Encourage customised valorisation with professional support

67. For a more detailed discussion, see: *Shaking up the system* (Adviesraad voor wetenschap, technologie en innovatie 2019).
68. See: https://www.vereniginghogescholen.nl/actueel/actualiteiten/hbo-studenten-helpen-het-mkb-te-innoveren and https://regieorgaan-sia.nl/financiering/Innovatietraineeship/

- **Organise a professionalised approach to valorisation that is systematic and also allows for customisation and flexibility. Not every knowledge institute will carry out valorisation in the same way and to the same degree for societal impact. Creating scope for differentiation will make valorisation more targeted and more effective.**
  - Government and parliament need to create clarity regarding what is expected of knowledge institutes in terms of valorisation.[69] Contribute to strengthening the position of valorisation within (the organisation of) knowledge institutes.
  - The guiding principle must be that valorisation activities by knowledge institutes should be focused on where they lead to societal impact, and not simply imposed equally on everyone as a standard requirement. The specific nature of knowledge institutes (and the different departments/disciplines within them) needs to be taken into account. For example, valorisation of fundamental research by companies will be less likely, but much more so by an institution that focuses on applied research.
- **Ensure that knowledge institutes set out their long-term goals in their strategic plans as regards valorisation and – relevant for this report – knowledge transfer to companies.**
  - Knowledge transfer to companies can be a topic on which a knowledge institute wishes to base its profile. Following the earlier recommendation by AWTI to introduce a system of profile-based funding[70] will enable institutes to devote extra resources to this.
  - Knowledge institutes need to build an organisation and ecosystem for successful knowledge-sharing with companies, and to work on creating a culture in which valorisation is valued. This takes time and money. Lessons that can be learned from successful examples such as Leuven Research & Development and MIT are:
    - Ensure that researchers see the valorisation organisation as 'theirs'.
    - Build a professional organisation which can focus on achieving maximum societal impact in the longer term.
    - Organise a good system for scouting for potentially usable knowledge, both 'internally' and by giving companies access to develop potentially usable knowledge/ideas further.

69. Cf. Advisory Council for Science, Technology and Innovation (2019).
70. See Advisory Council for Science, Technology and Innovation (2019), section 4.3, pp. 52-54.

- Make a clear choice for themes that make the knowledge institute visible: make clear which major societal transition the knowledge institute is looking to address.[71]
- Organise structural collaboration (see also earlier recommendation) with other parties: build a network of other knowledge institutes and (SME) companies and start-ups around the knowledge institute with which experiments can be carried out in practice.
- As a knowledge institute, dare to set performance indicators around valorisation in general and – relevant for this report – more specifically, in relation to collaboration with companies. These performance indicators would be at the level of the institute as a whole and its component parts.[72] It is also important to incorporate this aspect of valorisation in staff appraisals, for example by rating collaboration with companies or participation in standardisation projects.
- Academic start-ups are also an effective means of linking knowledge with companies. See our recent report *'A better start. The key to growth of knowledge-intensive start-ups* (2020) for recommendations on how knowledge institutes and other stakeholders can ensure that start-ups have the greatest possible impact.

71. A good example of this is the University of Waterloo in Canada.
72. Cf. Council for Science, Technology and Innovation (2019), section 4.1, pp. 45-50.

Annexes

Annex 1 Knowledge pathways explored

The literature on valorisation, knowledge and technology transfer, university-industry collaboration and entrepreneurship lists all kinds of ways in which knowledge is transferred.[73] For this report, this information was supplemented and crystallised with examples from (Dutch) practice. These were then combined to form 18 recognisable and relevant pathway types for knowledge transfer; these are shown in the following table. The pathways were enriched with an analysis/assessment on several dimensions that are relevant for this report. The last column gives an indication of the urgency of interventions for each pathway type.

Pathway	Description	Relevant for[74]	Findings	Urgency of intervention
Interns and final-year students from education institutes in existing companies	During internships and graduate projects at companies, pupils and students are challenged to learn by applying their knowledge in practice. Supervisors from education establishments are also often involved. The topics are determined jointly ('push' and 'pull'), and when the assignment or dissertation, as well as meeting the key criteria set by the teaching programme, also contributes to product development or new business development, this can contribute to entrepreneurship.	Low-medium-high	Some companies make good use of this pathway, but some do not. There has recently been increased policy attention through the innovation traineeships and the 'SME route' in higher professional education. Despite this, there still appears to be much to be gained, especially for low and medium-innovative companies.	The urgency is modest for highly innovative companies, but high for medium and low innovative firms.
Starters on the labour market: starting work at existing companies after completing education	Education establishments equip pupils and students with new knowledge and skills. Taking into account the needs of society, the topics are determined by the knowledge institute ('push'). The new knowledge and skills can contribute to innovation.	Low-medium-high	In many respects, this is one of the most important knowledge transfer pathways, especially as it runs from all types of education establishment to all types of companies. Although the direct contribution to entrepreneurship is modest, it is still an important pathway,	The urgency is modest for highly innovative companies, but high for medium and low innovative firms.

73. The relevant fields are those concerned with technology transfer (e.g. Journal of technology transfer, R&D management, technology analysis and strategic management), academic entrepreneurship (e.g. Entrepreneurship theory and practice, Technovation), *innovation studies* (e.g. Research policy, Journal of product innovation management) and *university-industry interaction* (e.g. Industry and innovation, Journal of higher education) (Bekkers en Bodas Freitas 2008; Dutrénit, de Fuentes, en Torres 2010; Fabiano, Marcellusi, en Favato 2020; Filippetti en Savona 2017; Hayter, Rasmussen, en Rooksby 2020; Hughes en Kitson 2012; Kolympiris en Klein 2017; Nonaka 1994; Perkmann et al. 2013; Van Looy et al. 2011).
74. Relevant for companies with low, medium or high levels of innovative capacity.

Pathway	Description	Relevant for[74]	Findings	Urgency of intervention
			especially for medium and low-innovative companies. There is attention for this in policy through regional human capital agendas, but there would seem to be more potential in this pathway.	
Mobility of employees between knowledge institute and company	If researchers go to work at companies and vice versa, there is an opportunity for in-depth knowledge about a topic to find good ingress into practice, because the researcher can adapt the knowledge to the new context. Because of the high level of knowledge and greater work experience than, say, starters, this pathway can make a substantial contribution to entrepreneurship.	Medium-high	The impression is that mobility is already reasonably good between highly innovative companies and knowledge institutes, but could be better among medium and low-innovative companies. We are not aware of any policy to stimulate this.	For highly innovative companies, the situation is not problematic, but improvements are needed for less innovative companies.
Dual roles for employees between knowledge institute and company.	Where researchers work partly at a knowledge institute and partly at a company, they are not only able to disseminate the knowledge from the knowledge institute to the company, but can also pass on relevant knowledge needs from the company in the form of a research question for the knowledge institute.	Medium-high	Large, highly innovative companies make use of this pathway, for example through part-time or endowed chairs. This is more problematic for smaller, less innovative companies. This pathway has lots of potential. Previously there was the Casimir programme, but we are unaware of any current policy that addresses this issue.	For highly innovative companies, the situation is not problematic, but improvements are needed for medium-innovative companies.
Science parks and campuses	Physical proximity of researchers from knowledge institutes and entrepreneurs from companies helps with knowledge transfer. Topics for knowledge development are determined by knowledge institutes ('push'), but the initiative for collaboration can just as easily come from companies ('pull'). The contribution to entrepreneurship is potentially considerable.	Medium and high	There is growing attention for physical proximity between researchers and companies, both in policy and in practice. Many things are thus going well, but further encouragement is still needed. Physical proximity on its own is not a sufficient guarantee for collaboration.	Moderate
Field labs, innovation and SME work placements	Entrepreneurs and researchers come together physically at these locations to address practical questions. The topics and the initiative came from both sides ('push' and 'pull'). The contribution to entrepreneurship is considerable.	Low-medium	This is a more recently emerging phenomenon which appears to meet an important need. There are also a number of policy programmes and	Moderate

Pathway	Description	Relevant for[74]	Findings	Urgency of intervention
			initiatives by knowledge institutes to stimulate this. Further development is recommended.	
Spin-offs	More and more new companies are being launched based on knowledge generated by knowledge institutes ('push'). Incubator facilities and entrepreneurship training help make pupils, students and employees aware and impart skills in running a business.	Medium-high	Spin-offs have received a great deal of attention in recent years. Improvement is needed for knowledge-intensive spin-offs (highly innovative) (see other AWTI report). Additionally, all knowledge institutes now have facilities for the launch of new business activities, such as incubators and centres for entrepreneurship.	High for highly innovative companies, low for medium-innovative firms.
Contract research, consultancy and training	Knowledge institutes carry out research commissioned by industry. This is sometimes carried out jointly, but is generally delivered in written document form. The initiative clearly lies with the company ('pull'). The contribution of this pathway to entrepreneurship is modest, as it mainly uses existing business models. Knowledge institutes can carry out advisory assignments and training at companies; the initiative here generally lies with the company ('pull'). The contribution to entrepreneurship will often be modest.	Low-medium-high	A lot of contract research is carried out. The government plays a limited role here. There is also adequate opportunity to obtain advice and purchase training. This knowledge-sharing pathway is reasonably well developed, requires little from government and currently demands no additional attention.	Low
Public-private partnership (PPP) joint agenda-setting and collaboration. Co-publishing and co-patenting are possible outcomes of PPP.	Joint agenda-setting of research and collaboration on implementation lead to knowledge-sharing in several ways. Determination of the topic and the initiative lie with both the knowledge institute and the company ('push' and 'pull'). This type of research is mainly pre-competitive, but can ultimately definitely contribute to entrepreneurship.	Medium-high	An important mechanism which receives ample attention via the Top Sectors policy. There is a fair amount of co-publishing between knowledge institutes and companies. This is only relevant for some companies.	Low
Standardisation programmes	Standardisation projects involve making design and quality agreements for specific products or services. Incorporating recent knowledge in the standard will familiarise companies with it and enable them to apply it. The initiative for this generally comes from companies ('pull'). The contribution to entrepreneurship is moderate.	Low-medium	The Dutch standardisation institute (NEN) administers and organises standards. To foster knowledge transfer and innovative entrepreneurship, it is important that the most recent knowledge is adequately incorporated in standards. However, there are few	Possible

Pathway	Description	Relevant for[74]	Findings	Urgency of intervention
			incentives for researchers at knowledge institutes to participate.	
Patents and licences	New working principles are laid down in patents, which also establish their ownership. Licences enable others to make use of this knowledge. The knowledge stems from research carried out at knowledge institutes ('push') and makes a modest contribution to entrepreneurship.	High	This knowledge-sharing pathway is well developed. The contribution to entrepreneurship is modest.	Low
Publications in **scientific journals** and **trade journals**	Research results and new ideas are published in scientific and trade journals, making them available for companies ('push'). There is little or no gearing of the knowledge to the local practice of a company, and it will make only a small contribution to entrepreneurship.	Low-medium-high	Research results are published very widely, and increasingly through open access. The contribution to entrepreneurship is limited.	Low
Knowledge desk, knowledge brokers and business developers at knowledge institutes	Knowledge institutes increasingly have 'desks' and brokers to make knowledge accessible and establish links with external parties, including companies. This opens access to knowledge that is present within knowledge institutes ('push'). This can also benefit businesses.	Low-medium-high	Knowledge institutes increasingly have 'desks' and functions to make knowledge easier to find. This can help businesses. However, there is little attention for this in policy (apart from the general valorisation task of knowledge institutes and the Thematic Technology Transfer (TTT) scheme. Making interesting ideas available for innovative companies is an issue. For medium-innovative companies, it is important that the knowledge can be accessed easily.	High
Demand pooling (including 'crowd-funding')	Different SMEs, for example from the same sector or region, often have comparable knowledge needs. Where a single company is unable on its own to obtain answers to its needs, working in combination with others makes this possible. These are needs on the part of industry ('pull') which can be closely linked to entrepreneurship.	Low-medium	There is a strong need for this, and it can make a major contribution to entrepreneurship. It currently occurs too little because it is 'nobody's problem'. There are virtually no policy instruments to promote this.	High

Pathway	Description	Relevant for[74]	Findings	Urgency of intervention
Research **partnership** (including data partnerships)	Research partnerships are deep strategic alliances for the long term, between often large companies and knowledge institutes. Often, a new organisation is set up where people from both partners carry out research side-by-side. The research topics are largely driven by industry, which is generally paying ('pull').	High	This is a relevant pathway for a specific group of companies and knowledge institutes, and appears to work adequately in the light of this report.	Low
Conferences and fairs where research results are shared.	Researchers from companies and knowledge institutes present research results at conferences, where they also share knowledge. This is primarily a 'push' mechanism which makes virtually no contribution to entrepreneurship.	High	Conferences at which research results are shared are very common. The contribution to entrepreneurship is limited, as is the role of the government.	Low
Participation by companies and knowledge institutes in regional boards.	'Triple-helix' alliances arise in regional boards, in which companies, knowledge institutes and regional authorities work together on a vision, strategy and agenda for the region. The demand mainly comes from the community ('pull'). Entrepreneurs can play a major role on these boards, but the contribution to entrepreneurship is limited.	Medium-high	Makes a limited contribution to entrepreneurship.	Low
Advisory board roles for researchers	Researchers from knowledge institutes can be members of company advisory boards or supervisory boards. This enables the company to make use of their knowledge at management level ('pull').	High	This is relevant for only a select number of companies.	Low

Annex 2 Reviewers

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

The reviewers for this report were:

- J.D. (Arjen) Goetheer, Senior policy adviser on research policy and strategic collaboration at VU University Amsterdam
- Luc Hulsman, Programme manager of the Samenwerkingsverband Noord-Nederland partnership

Annex 3 Interviewees

Paul Althuis	TU Delft
Louis Beijer	Ministry of Economic Affairs and Climate Policy
Frank Biemans	NTS Norma
Dave Blank	Twente University
John Blankendaal	Brainport Industries
Shiri Breznitz	University of Toronto
Jasper Deuten	Rathenau Instituut
Joost Dieleman	Ministry of Economic Affairs and Climate Policy
Johan van Erp	Municipality of Eindhoven
Roel Esselink	Association of Universities in the Netherlands
Aard Groen	Groningen University
Steven de Groot	Zuyd University of Applied Sciences
Ida Haisma	Leiden Bio Science Park (LBSP)
Robin van IJperen	Ministry of Education, Culture and Science
Martijn Janmaat	Ministry of Economic Affairs and Climate Policy
Matthijs Janssen	Dialogic/University Utrecht
Marcel Kers	Plantlab
Ilkay Kizil	Ministry of Education, Culture and Science
Mirjam Leloux	Innovation Exchange Amsterdam
Anne-Wil Lucas	Kennispark Twente
Pieter Moerman	Talent for Technology Platform)
Marian Sanders	Ministry of Economic Affairs and Climate Policy
Dennis Schipper	DemCon
Martin Scholten	Wageningen University & Research
Wout Scholten	Utrecht University of Applied Sciences
Steven Schuurman	Elastic
Martin Schuurmans	Former member of AWTI
Erik Stam	Utrecht University
Ben Tax	Rijk Zwaan
Caroline Tempel	Ministry of Education, Culture and Science
Liselotte van Thiel	Ministry of Economic Affairs and Climate Policy
Sue-Yen Tjong	Rathenau Instituut
Hugo Velthuijsen	Hanze University of Applied Sciences
Martijn Verwegen	Association of Universities in the Netherlands
Lucien Vijverberg	Ministry of Economic Affairs and Climate Policy
Michiel Vos	Cocopallet
Peter Wennink	ASML

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Awti Advisory council for science, technology and innovation

Prins Willem-Alexanderhof 20
2595 BE Den Haag
t. +31 (0)70 3110920
e. secretariaat@awti.nl
w. http://english.awti.nl