

Annual Report 2018

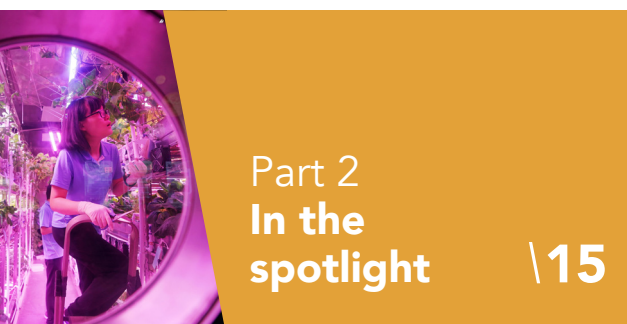


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Photo previous page: Amsterdam traffic warden on scan scooter. Retention of data was the subject of much debate in 2018.

Photo: Peter Hilz / HH

Preface

The Netherlands is getting cleverer all the time. We live in a country where almost 80% of the population have been educated to at least senior secondary vocational level (MBO level 2). The number of those who have completed higher education is eight times more than fifty years ago. All that knowledge is badly needed for our prosperity and for the changes we are undergoing as a



“The Rathenau Instituut helps politicians and society retain their grip on the future.”

society. Science and technology are changing healthcare, our work, the way we shop, the news, and even our democracy.

For our knowledge-driven society, we need independent sources and objective, reliable information. Reference is then often made to the media. Both the traditional media and social media platforms are increasingly using artificial intelligence and data to personalise or prioritise information. That is important for both young and old.

How do we know that we aren’t being manipulated? Education has an important role to play here. Schools and universities can help young people to become balanced and technologically critical, and teach them to recognise disinformation. As a society and as individuals, we must continue to invest in knowledge and education.

The Rathenau Instituut also takes on some of the responsibility for this, aiming to make us aware of the societal effects of knowledge and technology. In 2018, for example, it investigated how we can use digitalisation to make better decisions. It also wrote about the impact of artificial intelligence and about the importance of preserving everyone’s trust in technology.

Studies of this kind give policymakers and politicians a realistic picture of new scientific advances. The Rathenau Instituut shows which questions remain unanswered and investigates how our country can design knowledge ecosystems to answer them, so that future generations can face the future with confidence and optimism.

The Rathenau Instituut helps politicians and society retain their grip on the future. It looks ahead, identifies opportunities, and warns about what can go wrong. This Annual Report tells you about what we contributed in 2018.

Gerdi A. Verbeet

Chair of the Board of the Rathenau Instituut

Part 1 Impact

From civil servants to nurses and from professors to businessmen: we reached a lot of people in 2018. This part of the Annual Report tells you about how we have been discussing the challenges of our time – everywhere.

Students and staff in the Forum at Eindhoven University of Technology.
Photo: Bart van Overbeeke / HH

We've awakened from our "California dreaming"

In 2018 we again showed the direction in which science and technology are moving in the Netherlands. That makes director Melanie Peters optimistic. "The Netherlands is convinced that maintaining trust in digitalisation is of great importance for the knowledge society."

"After a decade of euphoria about all the good things that the digital transition would do for us, 2018 was undeniably the year in which we were made to face the facts. We received all kinds of signals that artificial intelligence, algorithms, and data are also having unwelcome effects on our society and on our lives.

The revelations about the British firm Cambridge Analytica came to symbolise that trend. That company had misused tens of millions of Facebook accounts to aid the Trump campaign in 2016. The downfall of Cambridge Analytica meant that tech companies lost much of their sparkle and public opinion shifted. The European Commission also woke up to the problem in 2018. Not only was the EU's GDPR privacy legislation introduced, but the Commission also imposed a record fine of 4.34 billion euros on Google for abuse of power with its Android mobile operating system.

Welcome developments

As a knowledge-driven society, we are of course open to new technologies and innovations, but ultimately it's all about whether they have the desired effect on our lives. We also need time to adapt to innovations. It's true we can find information increasingly quickly, but at the same time we are increasingly unable to arrive at a well-considered opinion about it.

Even millennials, for whom social media are very important, are not necessarily 'techy'. Being able to estimate the true value of news is a different skill to making extensive use of social media. And what about our autonomy if artificial intelligence determines which news items we get to see? Or our evaluation skills if software takes over decision-making from us?

Asking the right questions

At the Rathenau Instituut we investigate what impact science and technology have on society and how that impact can be positive. We carry out research and thus support debate in political circles and in society. A whole range of people and organisations helped us answer those kinds of questions in 2018: researchers in the humanities and the natural and behavioural sciences, as well as ethicists, NGOs, hands-on experts, and many others. They also helped us to keep asking the right questions so we can contribute to the continued positive development of the Netherlands.



Director Melanie Peters: "My hope is that we can make the choices about technology that we really want to make."

In a democratic society, what counts as positive is naturally always open to discussion. We promote dialogue by means of our reports, publications, and appearances in support of Members of Parliament and in the media.

An overview of our conclusions

In 2018 we again showed the direction in which science and technology are moving in the Netherlands, and how we can work towards the desired goal. Our conclusions were often gratefully adopted or were the object of further discussion. Parliament and ministries frequently made reference to our reports.

We shared our insights with local administrators and civil servants, and with policymakers at EU and international level. And more media than ever referred to our research. This Annual Report provides an overview.

We also consider the ‘questions behind the questions’. How does our knowledge ecosystem work? Is it prepared for future questions, and for questions from other parts of the world? For example, the policy of rewarding outstanding researchers with grants and subsidies has been successful, but there is still too little appreciation for our universities’ other core tasks – teaching and knowledge-sharing with third parties. In our publication on that topic, we indicated how the ‘excellence policy’ could be designed differently.

Strategic collaboration

Knowledge is an important factor for companies when they decide to establish themselves in the Netherlands. Companies increasingly seek a new kind of strategic collaboration with Dutch universities. Proximity is important so as to learn enough from one another and to innovate purposefully.

That requires making sensible decisions, so that the collaboration is desirable and positive for all the parties involved – government, businesses, and universities – including in the long term. We wrote that universities should develop a decision framework for this, but with collaboration not hindering the various different tasks that they have. That is where the strategic choice lies.

We saw that successful innovations are based on collaboration at national, regional and local level. The aim is clear: respecting such values as security, privacy, and accessibility.

The Netherlands is good at this kind of cooperation, especially when it comes to tackling major societal challenges. Artificial intelligence can help us with this, but I don’t think that will happen of its own accord. We have always worked hard on consensus-based policymaking, and in 2018 it became apparent that doing so is also needed in the digital age of artificial intelligence.

Discussion underway

To the extent Dutch society was in fact ‘California dreaming’, in 2018 we finally awakened from that dream. Our research shows time and again that no technology works by itself, not even data technology. All that technology and discussion of it are encouraging us to talk about what we actually consider to be important, in the workplace and in the context of local democracy. My hope is that we can make the choices about technology that we really want to make.




This Annual Report provides an impression of what we were doing in 2018. It makes me optimistic. We are much more aware of the undesirable societal effects of the digital transition, and are convinced that maintaining trust in digitalisation is of great importance for the knowledge society.

Looking to the future

It’s now 2019 and we have a new work programme. As with previous programmes, the core idea is once again how Dutch society utilises knowledge and technology while paying due attention to people and values and keeping control of things.

That remains a terrific challenge for us to tackle. I hope you’ll continue to follow what we are doing this year, in the media and at meetings, through our publications, social media, website, and newsletter. The Rathenau Instituut is synonymous with dialogue, and we greatly appreciate your contribution in that respect.”

Stay informed

Via our newsletter: rathenau.nl/nl/nieuwsbrief and via  Twitter,  LinkedIn and  Facebook

In discussion



Intermezzo at a debate organised by the Rathenau Instituut with SETUP in Utrecht.
Photo: Sebastiaan ter Burg

In 2018 we continued updating journalists and interested citizens about important developments in science and technology. We also encouraged debate via our redesigned website and newsletter and via social media. In addition, we conducted research with external partners, such as municipalities, the police, and the Ministry of Agriculture, Nature and Food Quality. And we held live discussions with people at conferences, festivals, workshops, and presentations in the Netherlands and abroad. The next few pages give an impression of those discussions.

In discussion with politicians and society

The Rathenau Instituut in figures:



875x

Coverage in newspapers, magazines and online



11

Radio and TV appearances



3666

Newsletter subscribers

Online community: **12,290**

of which:



7117



4089



933



151



Visits to our website

183,277

Unique visitors to the website

116,362



247

Presentations, participation in debates and appearances as an expert

Better factual knowledge thanks to data

Data expert Viktor Mayer-Schönberger was the keynote speaker at the Rathenau Instituut's autumn event. He is hopeful about the future: "We need to embrace the Enlightenment."

"We find ourselves in a paradigm shift that resembles the Industrial Revolution, or the aftermath of the advent of the printing press. Someone from back then would undoubtedly give the wrong answer when asked how things would develop. It's the same today; we don't know where the world is going. What we do know is that all the money markets are being supplemented and replaced by data markets. It's all about how that data is used, and for what purpose."

That's what Viktor Mayer-Schönberger, Professor of Internet Governance and Regulation in Oxford, had to say prior to his lecture in The Hague on 15 November 2018. But he is hopeful about the future. "Thanks to big data, artificial intelligence and machine learning, we can identify patterns in data that can help us make better decisions. The hope is for better decision-making. The hope is for better factual knowledge."



"We need to embrace the Enlightenment."

All we need to do is embrace a very old European value, one which may well have arisen in the Netherlands, and that's the Enlightenment."

Mayer-Schönberger did have a warning for people who see data as property. That's not what it's all about. "The future is not about appropriating, dividing up, and allowing only limited access to data, insights, and knowledge. The future of humanity is that we can make better decisions, based on more knowledge. That means that we need to share that knowledge more widely."

"Technologies that help companies improve our lives, that don't mislead anyone, and that you can also avoid are 'nudges for good'."

Tim Jacquemard and Rinie van Est in their widely read article on how companies influence us with digital techniques



PANEL DISCUSSION ON DIGITAL HEALTH

21 July, Haarlem

What effects do technologies have on our pursuit of a perfect body and a perfect mind? At the Dolhuys Museum, Maartje Niezen and healthcare professionals, technology philosophers, and others explored the boundaries of digital health.



THE FUTURE OF ALGAE

18 October, Utrecht

The rapid developments in biotechnology offer opportunities for genetically modified microalgae. With the National Institute for Public Health and the Environment (RIVM), we organised a meeting on the future of algae in a "bio-based economy".



ONLINE DEMOCRACY

7 and 21 November, The Hague

With Pakhuis De Rêgâh and the Council for Public Administration (ROB) we organised two evenings about the effect of new technology on online democracy. What does it do for us, and how can we improve it?



EARTH-FRIENDLY FOOD

25 April, Amsterdam

How do we ensure that technologies also benefit farmers, consumers, and the Earth? De Rode Hoed organised a debate on this topic. Melanie Peters was one of the speakers.



REGISTRARS AND DIGITALISATION

5 October, Gouda

At the annual conference of the Association of Registrars, Iris Korthagen, Ira van Keulen, and Paul Diederer gave a workshop on "The Registrar in Ten Years' Time: What Role will Digitalisation Play?"



THINKING ABOUT DATA

1 November, 's-Hertogenbosch

During the 's-Hertogenbosch Data Week, Melanie Peters took part in the "dialogue table" on Thinking about Data, a discussion of digital resilience, government responsibility, and algorithms. The event was organised by the Public Thinking network platform.



KNOWLEDGE FOR THE CITY

26 March, Rotterdam

Rotterdam organised this festival for everyone who wants to bring knowledge and research more into line with the lives of Rotterdammers and the policies of the city. Geert Munnichs gave a workshop.



LOCAL ADMINISTRATORS

26 June, Maastricht

How can local administrators participate in the digital society for the benefit of society? Rinie van Est presented the report we drew up for the Association of Netherlands Municipalities (VNG).

BIOTECHNOLOGY AS DATA SCIENCE

20-21 March, Bergen

Digitalisation is increasingly transforming biotechnology into a data science. The Centre for Digital Life held a symposium on this topic. Pieter van Boheemen talked about "open science" and ethically responsible innovation.

**RISKS OF NEW TECHNOLOGY**

6 November, Tokyo

Pieter van Boheemen took part in a panel discussion about the risks of new technology for people and their values. This was in the framework of the International Network for Government Science Advice.

**IMPACT OF SCIENCE**

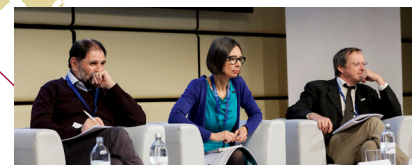
14-15 June, Ottawa

AESIS is a network of experts who promote and evaluate the impact of science on society. In Ottawa, Barend van der Meulen took part in a discussion of the "Science of Science Impact".

**iGEM COMPETITION**

26-29 October, Boston

Pieter van Boheemen attended the annual iGEM competition: which student team can make the best machine from genetic material? Pieter is a member of the committee that incorporates the ethical side of the competition into the rules of the game.

**IMPACT OF RESEARCH AND INNOVATION POLICY**

5 November, Vienna

Leonie van Drooge and other researchers from all over Europe talked about the challenges of achieving, understanding, and assessing societal impact through research and innovation policies.

**ACTE DE PRÉSENCE**

8 June, Paris

Eight researchers from the Rathenau Instituut gave presentations at the European forum for studies on research and innovation policy. Among other things, they discussed living labs and excellence policy.

**ELITISM DAY**

25 September, Duisburg

The Institute for Development and Peace organised a workshop at which Iris Korthagen spoke about how digital participation by the public can help reduce the democratic deficit of international cooperation.

**DIGITAL TRENDS**

27-28 September, Genoa

Rinie van Est took part in a workshop on Advanced Robotics and its Social Impacts. He spoke about developments in the debate in the Netherlands on digital trends.

In the media

The omniscient computer

A report by the Rathenau Instituut is not reassuring: "We are currently trailing 5 to nil: the computer knows a lot about us but we know virtually nothing about its algorithms and the business models underlying them."

Nederlands Dagblad, 13 January 2018 \ Human Rights in the Robot Age

Internationalisation

Twenty years ago, academics were promised they would become part of a cosmopolitan community. This has had clear consequences. Of the students in the Netherlands, 16% are now from abroad, and the figure is almost 40% for those taking a research Master's degree. According to the Rathenau Instituut, one third of lecturers now hold a foreign passport.

Elsevier Weekblad, 10 February 2018 \ Grensverleggers [Pioneers]

Dutch Data Protection Authority

The Dutch government has decided to almost double the budget for the Dutch Data Protection Authority. One reason for that decision was a report by the Rathenau Instituut stating that new technologies can both reinforce and undermine important values such as privacy, non-discrimination, human dignity, human rights, and the right to a fair trial.

ICT Magazine, 12 March 2018 \ Urgent Upgrade

Intimate technology

Clinical physicist Aart Nederveen uses a term coined by the Rathenau Instituut: "intimate technology". That's because technology is no longer just outside us; more and more, it's really close. A chip to increase your intelligence even gets literally under your skin. Nederveen advocates adopting a position between rejection and acceptance.

Reformatorisch Dagblad, 11 April 2018 \ Intimate Technology

Germline modification

A topical illustration comes from a report by the Rathenau Instituut. According to the Institute, researchers who advocate greater scope for experiments on embryos using germline technology often employ pragmatic arguments, such as "people with hereditary conditions also want to have healthy children".

Groene Amsterdammer, 19 May 2018 \ Rules for the Digital Human Park

Disinformation and personalisation

Welcome to a report on the battle against freedom of expression disguised as the battle against fake news! Today, a real report. It comes from the Rathenau Instituut and you'd never have guessed: "This study shows that disinformation and personalisation have not yet had any major negative impact on society."

GeenStijl, 24 May 2018 \ Digitalisering van het nieuws [Digitalising the News]

Crystal ball

The Rathenau Instituut hasn't got a crystal ball, and it can't predict the future. But its message for towns and cities is don't let yourself be surprised, and start thinking about self-driving transport as soon as possible.

RTV Utrecht, 19 October 2018 \ Valuable Digitalisation

National Knowledge Institutions

The Rathenau Instituut recently published a report that checked the independence and integrity of all the National Knowledge Institutions (NKIs). All the instruments, agreements, prohibitions, and conditions to prevent transgressing the boundaries between legitimate research and grasping politicians – they're enough to make your head spin!

De Volkskrant, 3 November 2018 \ Met gepaste afstand [At an Appropriate Distance]

Public values

We have made grateful use of the framework from the Rathenau Instituut's report to show the public values that are coming under pressure in the "smart city", and what you can do about it.

Stadszaken.nl, 21 November 2018 \ Urgent Upgrade

Builders

The report's recommendations are relevant and useful. At the same time, they seem far removed from the day-to-day practice of (IT) professionals, the builders of the digital society.

iBestuur, 29 November 2018 \ Directed Digitalisation

Data breaches

Melanie Peters too sees leakage of data to major players in the US and China as a serious problem for Europe. Peters is the director of the Rathenau Instituut, which has carried out extensive research on the data economy.

FollowTheMoney, 5 December 2018

On the agenda



Among other things, the Rathenau Instituut researches the impact of innovation on society.
Photo: Frank de Roo / HH

In 2018 we continued to support political debate on the impact on society of science, innovation, and technology. We inform politicians – asked and unasked – about our research, before and during technical briefings and round-table discussions. In our reports we indicate options for political choices, so that politicians can make their own decisions. Parliament and ministries frequently made reference to our reports. The next few pages provide an overview.

507

Total number
of references in all
official documents

107

Number of Memoranda
or reports to Parliament
referring to Rathenau
Instituut publications

37

Number of parliamentary
debates with Rathenau
Instituut's output used in
argumentation

19,632

Number of downloads
from the website

Twelve questions about digitalisation

Together with the Social and Economic Council of the Netherlands (SER) and dozens of experts, we formulated twelve questions for the agenda for the digital society.

In December 2017 and January 2018, we held two sessions with companies, policymakers, and other participants to explore which digitalisation issues they consider urgent and what solutions they envisage. We organised this round-table conference together with the Social and Economic Council of the Netherlands (SER). After the initial meeting, we clustered the issues raised into twelve challenging questions that demand urgent answers:

1. How can we protect the country's vital infrastructure against cybercrime and espionage?
2. How can we deal with the lack of transparency of algorithms?
3. How can we come up with socially responsible methods of digital measurement and advice?
4. How can we give shape to public dialogue about digitalisation?
5. How can the Netherlands be a leader in socially responsible digitalisation?
6. How do we safeguard public values during the design process?
7. How do we regulate the market for secure, privacy-friendly products?
8. How do we deal with dependence on major market parties?



Increased support for digitalisation after discussion at SER.

9. How do we make people digitally robust?
10. How do we keep a grip on economically and socially relevant flows of data?
11. How do we remain attentive to meaningful human input in the data economy?
12. How do we give shape to professional codes for the ICT sector?

At a second meeting, participants elaborated on these questions. In June 2018, the Dutch government took these questions into account in its first cabinet-wide digitalisation strategy. Many questions remain open, however. They will be back on the agenda at the 2019 digital summit and we hope to have already formulated many answers by then.

"It's hard to believe that after so many years there's finally a minister who dares take the first step towards a phase-out."

Rosella d'Angeli, campaign leader of An Animal (A) Friend, after the Memorandum to Parliament on the report From Primates to Better

In the political arena

The Dutch government announced in December 2018 that it would be starting a campaign against disinformation in 2019, referring extensively to research by the Rathenau Instituut. In fact, it frequently made such references in the course of 2018. Here is an overview.

1. The government responded as follows to our reports on new technologies

"We need to be alert to the spread of disinformation"

The 2019 elections must be free and fair. The government is therefore focusing on awareness-raising and research regarding disinformation. This was announced by the Minister of the Interior, Kajsa Ollongren on 13 December. "Although there are many positive aspects to technological developments, the government endorses the Rathenau Instituut's conclusion that we need to be alert to their being misused, for example by spreading disinformation."

"Workgroup for new technologies"

The Dutch government also devoted a news item to our reports in March, noting that "New technologies can both reinforce and undermine important values and human rights, according to the Rathenau Instituut. They also offer social and economic opportunities, opportunities for better and more efficient services, or opportunities for education. The government will therefore investigate further the societal effects of technological developments and will set up an interdepartmental working group. The budget for the Dutch Data Protection Authority will also be almost doubled."

2. The government responded as follows to our reports on innovation

"Innovation without laboratory animals requires changes"

"The Rathenau Instituut emphasises that research without the use of laboratory animals demands a paradigm shift. I agree." Minister of Education, Culture and Science Ingrid van Engelshoven said this in November in response to parliamentary questions about experiments on primates.

"Perhaps additional spending on research and innovation"

In their memorandum to Parliament on innovation policy, the Minister and State Secretary for Economic Affairs and

Climate Policy, Eric Wiebes and Mona Keijzer, referred to the report Total Investments in Science and Innovation (TWIN) 2016-2022, which states that government funding for research and innovation is likely to decrease proportionate to GDP. According to them, "These TWIN figures do not take into account possible extra spending on research and innovation resulting from other intensifications in the coalition agreement, such as those for defence and cybersecurity, care, regions, and climate".

"Government becoming knowledgeable about the sharing economy"

State Secretary Keijzer responded in January to the Institute's report *Eerlijk delen* [A Fair Share]: "Through research, evaluation of policy, and dialogue with platforms, municipalities and knowledge institutions, the government is gaining more and more knowledge and experience in order to effectively steer sharing-economy activities, where necessary, with a view to safeguarding public interests. The Rathenau Instituut's report also contributes to this."

3. The government responded as follows to our reports on research

"The knowledge within public knowledge organisations doesn't link up sufficiently with municipalities"

Minister Ollongren noted in March: "As also pointed out by the Rathenau Instituut, the knowledge demands of municipalities and the supply of knowledge by the public knowledge organisations don't yet match up sufficiently."

"Getting your PhD is worth it"

In May, Minister Van Engelshoven wrote: "I am pleased with the results of this study by the Rathenau Instituut. It shows that getting your PhD is worth it. For society that's because people with a PhD have skills and apply them in practice as needed. For the PhDs themselves, it's because the great majority find work, inside or outside the university, that is consistent with their doctorate and in which they can utilise the research skills they acquired on the way to gaining it."

"Getting a grant isn't equally important everywhere"

Minister Van Engelshoven wrote this in May about our study of excellence grants: "One can conclude from the report that obtaining an excellence grant isn't always an equally important selection criterion. And young researchers don't need to depend on getting one in order to obtain a permanent position."

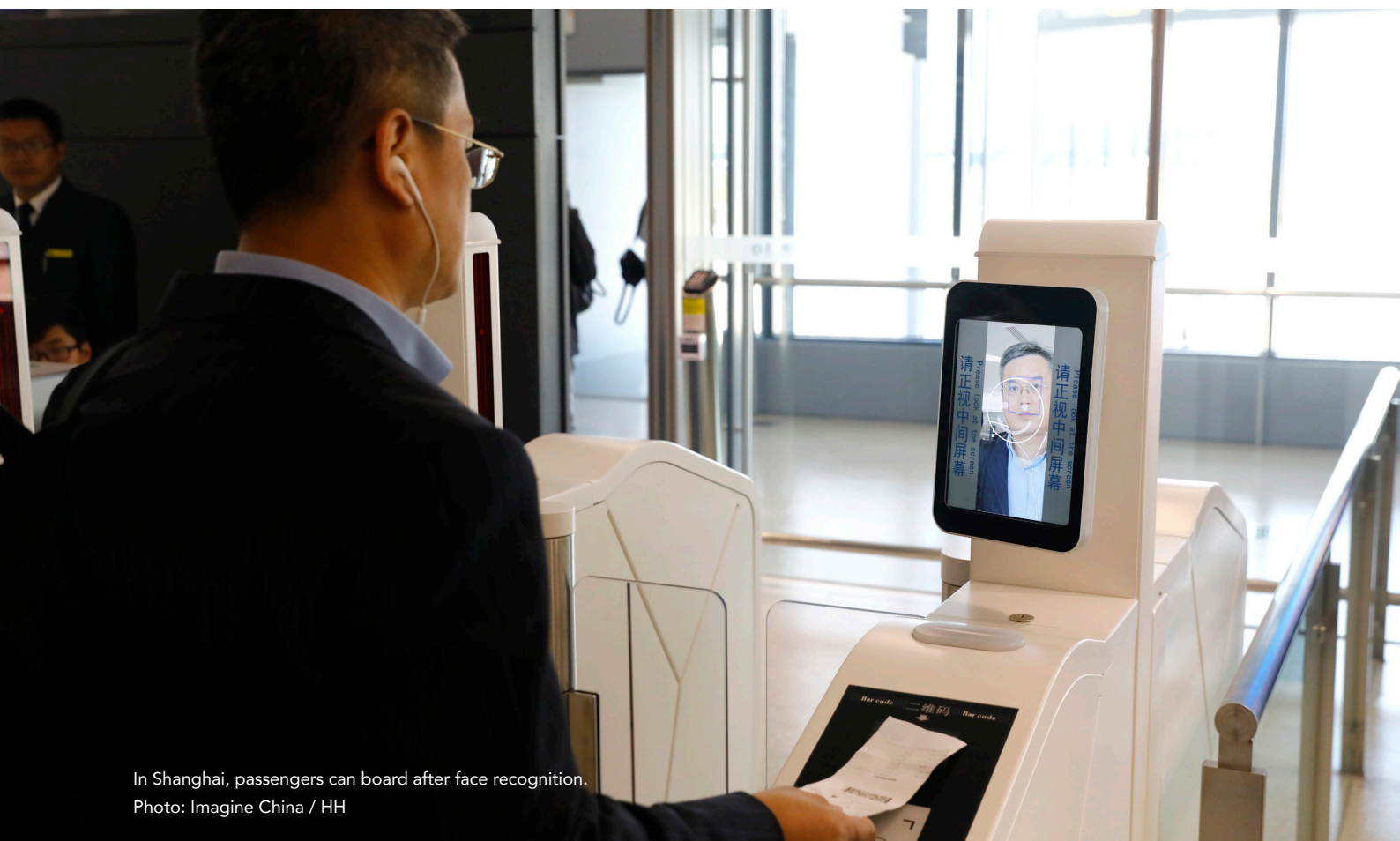
Part 2

In the spotlight

From artificial intelligence to rewarding outstanding researchers and from news manipulation to regional innovation: this part of our Annual Report tells you about our research on each theme in 2018.

This Chinese researcher took the term “living lab” very literally, living for a year in an enclosed greenhouse.
Photo: Eyevine / HH

How do we retain a grip on our "onlife" future?



In Shanghai, passengers can board after face recognition.
Photo: Imagine China / HH

Digital technology is everywhere. It's changing how teachers teach, how doctors and patients talk to one another, what politicians debate, and how people share news. It means that society is constantly being reorganised; we are undergoing a digital transition. The Rathenau Instituut is investigating the impact of that transition on our lives.

Insufficient awareness of news manipulation

The Netherlands needs to be on guard against fake news.

The Netherlands has not yet had to deal with large-scale online distribution of politically tinted disinformation. Only very little online news is tailored to the political preferences of news consumers. Nevertheless, new technologies are making it increasingly easy and cheaper to manipulate online news. The country needs to be prepared.

That was our conclusion on 24 May in **Digitalising the News**. Most Dutch people get their news mainly from newspapers and broadcasters, whether or not online. These have a solid position and a less pronounced political stance than in a country like the United States. They hardly personalise the news that they disseminate online. Social media and search engines in fact do that, but they play a limited – although increasing – role.

At the same time, there is reason to be vigilant. The technology for falsifying news by manipulating sound and images or by using “social bots” is rapidly improving and becoming cheaper and more difficult to trace. The news stream can also be personalised more, which may lead to “filter bubbles”.



Newspapers and broadcasters hardly personalise their online offerings. Photo: Westend61 / HH

“We mustn’t be naïve; there’s fake news here in the Netherlands too.”

Response by Minister Ollongren, BNR Nieuwsradio, 24 May

10%

Percentage of jobs threatened by robotisation and automation, according to OECD in 2016.

Robotisering en automatisering op de werkvloer
[Robotisation and automation in the workplace], 2 May

300

Number of clickbait sites in the Netherlands in 2017, intended to attract people to adverts.

Digitalisering van het nieuws [Digitalisation of the news], 24 May

4

Number of virtues for digitalising appropriately: customisation, modesty, transparency, and responsibility.

Beschaafde bits [Decent Digitalisation], 20 July

31

Number of motions in the Dutch Senate and House of Representatives between January 2017 and July 2018 regarding digital security.

Doelgericht digitaliseren [Directed Digitalisation], 13 September

The Netherlands is only giving *unfocused* shape to the digital transition

The Netherlands' response to all the changes in the digital society is still far too fragmented.

The Dutch government believes that the country must become the best digital society in Europe. Just before summer 2018, it therefore presented the National Digitalisation Strategy. This states that consumers, businesses, and public authorities must collaborate in order to make that strategy a success. There also needs to be an annual Digital Summit, the first of which is scheduled for spring 2019.

Dozens of reports and parliamentary bills on digitalisation have appeared in recent years, particularly regarding privacy and cybersecurity. Nobody, however, is working on a plan that gets straight to the point and describes what the judiciary, for example, or the services provided by municipalities should look like. This is precisely where the major opportunities lie for the Netherlands and Europe; this is where we can distinguish ourselves favourably from China and the United States.

Five actions

Based on research, our report ***Doelgericht Digitaliseren [Directed Digitalisation]*** we set out five actions to give better shape to the digital transition. It is mainly a matter of socially responsible digitalisation. If companies, governments, and organisations give priority to people, and shape their actions in a more targeted way based on the challenges facing us in healthcare or education, for example, a digital society can emerge in which nobody is excluded.

Many steps have been taken in recent years in the field of cybersecurity and privacy, but issues such as discrimination, exclusion, and loss of autonomy have yet to be transformed into policy. The same applies to such issues as protecting democracy, the transparency of algorithms, and a fair market economy. For some technologies, there is hardly any attention in policy.



There are major opportunities for the Netherlands as regards socially responsible digitalisation.

Photo Rob Voss / HH

These include, for example, face recognition, virtual and augmented reality, and the effects of digital technology on health.

Impact

The report was referred to a number of times during General Consultations on digitalisation in the House of Representatives on 20 September. The Socialist Party MP Mahir Alkaya asked State Secretary Keijzer whether the ethical and moral issues surrounding artificial intelligence would become part of the AI action plan and the digitalisation strategy. Alkaya thought it important to involve institutions such as the Rathenau Instituut in such a strategy. The State Secretary agreed with him, answering with a short and sweet "yes".

There were then a number of specific responses from the side of the government. The Ministry of the Interior and Kingdom Relations presented a strategy and in November the public-private partnership AINED came up with an initial plan for a Dutch AI strategy. Attention is also being paid to targeted innovation, for example in living labs with various stakeholders. These do not focus on "selling" data but on developing a "data service" in which the focus is on the user.

"Ethics and fundamental rights shouldn't be the final element in digitalisation, but a central element."

Christian Democrat MP Mustafa Amhaouch, 20 September

How do we utilise knowledge for politics and society?



A street in Schokkerhaven (Flevoland province) flooded after a storm.
Photo: Martijn de Jonge / HH

In our knowledge society, we expect politicians to base laws on scientific insights, and in our daily lives too, scientifically based knowledge often forms the basis for our decisions. Nevertheless, there is regular controversy about policies on vaccination, ammonia emissions, or geothermal energy. Meanwhile, the challenges are only increasing. The Rathenau Instituut is investigating the input by experts and citizens in policy and political decision-making, with a view to making the best use of knowledge in order to improve society.

Internationalising applied research is in the national interest

The government is wasting an opportunity to strengthen the Dutch knowledge ecosystem.

Dutch institutions for applied research play an important role in the generation and dissemination of knowledge. In doing so, they are increasingly working beyond the country's borders, often within international partnerships. That reinforces their knowledge base. The government has yet to develop a broad overall strategy for internationalisation, meaning that the institutions have little scope for reaping all the benefits. According to the study **Verstandig internationaliseren [Sensible Internationalisation]**, Dutch companies, public authorities, and other knowledge institutions are consequently missing out on opportunities.

The Netherlands has five institutions for applied research: Deltares, MARIN, NLR, TNO, and Wageningen

Research. Internationalisation ensures that they can access international networks of experts and talented researchers, and can more easily address cross-border topics. They can thus remain large enough to be able to continue their often specialised work.

The scope for developing targeted international activities is limited because where contract research is concerned the knowledge institutions are dependent on international markets. In addition, central government has not developed an integrated overall strategy for internationalising the institutions, and provides only limited support for these activities. As a result, the benefits of internationalisation are not yet sufficiently exploited.

“When the birth of the cloned ‘Dolly the Sheep’ led to public concern, the Minister of Health, Welfare and Sport, Els Borst, asked the Rathenau Instituut to initiate a debate on the subject, including arranging a citizens’ panel and a hearing. Now, years later, people still seem to be concerned about cloning, while science is advancing at a furious pace – and not only in China. A wide-ranging debate is needed to increase people’s knowledge and awareness and to update the relevant regulations.”

Commentary in De Volkskrant, 26 January

5

Recommendations for regenerative medicine, which enables diseased tissues and organs to be repaired. Five recommendations were made by experts at a workshop moderated by the Rathenau Instituut, for the National Research Agenda.

Vijf aanbevelingen voor beloftevolle geneeskunde
[Five recommendations for promising medicine]
22 March

2020

The year when everyone must be able to specify what data healthcare providers are permitted to access.

Digitale gezondheidsregie [Responsible digital health management], 25 May

Six steps to getting people involved

Using online tools to get voters more involved in decision-making: it works.

People want to have more say in major political issues. Can that be arranged effectively online? At the request of the European Parliament, we researched that question with three European sister organisations. The pre-publication of the study, ***Online meebeslissen [Prospects for e-democracy in Europe]***, shows that online petitions and other public consultation initiatives often do not link up with political decision-making and therefore have little impact. But that can be fixed.

Background

Past experience with digital participation by the public has often led to disappointed participants. Their input seemed to have little impact on the final assessments and decisions. How could that be changed? To answer that question, we studied 400 publications and analysed 22 public consultation initiatives. It emerged that digital participation can strengthen democracy if initiatives meet a number of conditions:

1. Tie the consultation process to a specific agenda or decision.
2. Be clear about the process and the objective.
3. Provide feedback to the participants.
4. Don't just collect signatures.
5. Customise mobilisation: online and offline, depending on your target group.
6. Repeat and improve.

Impact

Ira van Keulen and Iris Korthagen explained the research on a number of occasions, including in the European Parliament. They said that the possibilities for participating in decision-making online should be seen as a positive supplement to representative democracy and not as a replacement for it.

Greater involvement on the part of voters doesn't mean that elected politicians will be less involved. The report was published before the municipal elections and the referendum on the Intelligence and Security Services Act – the ideal time to talk about the influence of voters on political decisions. There was a lot of interest in this issue in the media and in political circles. This was again evident during two well-attended debate evenings in The Hague which we organised together with the Council for Public Administration (ROB).

MPs Jan Middendorp and Sven Koopmans (People's Party for Freedom and Democracy) asked questions in parliament about the report, among other things in connection with problems that the Rathenau Instituut had identified in the digital consultation process. To tackle these problems, the Ministry of the Interior and Kingdom Relations is supporting municipalities with the digital democracy lab.



Civil servants discussing with the public in Utrecht.
Photo Bas de Meijer / HH

“Democracy is not a takeaway where you can choose what you like and ignore what you don't feel like. It's a single package and you have to participate actively.”

Gerdi Verbeet at an event at Pakhuis De Règâh in The Hague, 7 November

How can we keep our research system future-proof?



Rotterdamers pioneering at the roof-top farm near Central Station.
Photo: David Rozing / HH

We need knowledge so as to solve complex problems. Think of the cost of care, which increases as we all get older. New topics are being added all the time. Researchers are attempting to gather and develop knowledge about this throughout the country, from living labs to research groups and from business companies to university hospitals. How can we constantly get better at that? It requires the Dutch knowledge ecosystem to be equipped to answer new questions all the time. That is the subject of this theme.

The whole country is innovating

Half of the Netherlands' innovative companies are located in only thirty municipalities.

Innovation in the Netherlands isn't just a big-city phenomenon. Half the country's innovative companies are located in only thirty municipalities, with the rest elsewhere. Innovative start-ups and rapidly growing companies are mainly to be found in Amsterdam, Rotterdam, Haarlemmermeer (where Schiphol airport is located), and Utrecht. This is evident from the **Regional Innovation report**. Each sector has its own innovation centres, but that doesn't mean that sectors are concentrated entirely in particular regions. Companies and knowledge institutions are seeking collaborators throughout the country.

In the field of high tech, for example, parties from Brainport Eindhoven frequently work with parties in Amsterdam, Delft, and Enschede, while Wageningen is connected to the agricultural and horticultural sector throughout the country. Compared to the European average, all the Dutch regions are doing well. The analysis shows that Zuid-Holland is the province where there is most investment in R&D (3 billion euros), followed by Noord-Brabant (2.8 billion euros).



Bike path with solar panels in Krommenie.

Photo: Klaas Fopma / HH

"If you want to tackle the challenges facing society, you need new ways of working so as to organise and encourage research and innovation. Cities and regions are ideally suited to this because people can get in touch with one another there more easily."

Jasper Deuten, innovation theme coordinator, in Onderzoek Nederland, April

40%

Percentage of NWO and EU money for university research linked to excellence.

Dutch policy promoting scientific excellence,
14 February

5000

Annual number of people gaining their PhD in the Netherlands, a twofold increase in 25 years.

The impact of a doctorate, 10 April

68%

Percentage of researchers who find it important that their results are "socially relevant".

What motivates researchers?, 30 May

7,1

Of all the institutions studied, science scores highest for trust.

Public trust in science, 30 August

Doing good research is the priority

Researchers think that knowledge transfer is something for other people to deal with. The grants system contributes to this.

According to the report **What motivates researchers?** – based on a survey of 2613 researchers at over a hundred knowledge institutions – researchers say they spend most of their time on research. They often work overtime, on average for more than a quarter of the time they have been appointed for. Researchers at universities spend an average of 28% of their time teaching. At university medical centres, where half of full-time researchers work overtime for more than 12 hours a week, they spend 11% of their time on patient care. Researchers spend much less time on “knowledge transfer”, in which knowledge is used, among other things, for innovation and dealing with social issues. Almost half of all researchers don’t spend time on it, even though they think it’s important. Researchers at universities spend an average of 4% of their time on knowledge transfer.

Outstanding research

One of the reasons for this limited investment of time in knowledge transfer is that researchers do not see it as a task for themselves. That is made clear by the report **Excellent is niet gewoon [Excellence is extraordinary]**. The system of grants and prizes for



Spinoza Prizes ready to be presented. Photo: ANP

outstanding research means that career development at our universities is mainly determined by this, and less by good teaching or knowledge transfer. Earlier in 2018 we brought out the Facts & Figures publication **Dutch policy promoting scientific excellence**. Minister Van Engelshoven commented in May: “One can conclude from the report that obtaining an excellence grant isn’t always an equally important selection criterion. And young researchers don’t need to depend on getting one in order to obtain a permanent position.”

Research on request

The Rathenau Instituut sometimes carries out research at the request of third parties: ministries and other parties in the Netherlands, and EU organisations. One condition is that the subject fits in with the themes in our work programme and with our mission and public task. We always publish the research results. Here are a few examples:

- Research in the Netherlands
 - The knowledge base of the Ministry of Infrastructure and Water Management
 - Sensor data for security and quality of life, for the National Police Corps
 - Valuable Digitalisation: how local administrators can participate in the “technology game” from a public perspective, for the Association of Netherlands Municipalities
 - The Balance of Science 2018, for the Ministry of Education, Culture and Science
 - The ammonia file, for the Ministry of Agriculture, Nature and Food Quality
- EU research
 - How do you measure the impact of large-scale research centres? We are investigating this within the European “Accelerate” partnership for Horizon 2020
 - 3D printing for medical recovery and human enhancement for the European Parliament (STOA)
 - Prospects for e-democracy in Europe: lessons from research on digital public participation for the European Parliament (STOA)

What is the state of knowledge in the Netherlands?



Students and staff at Delft University of Technology listen attentively to a guest lecture by Prof. Robbert Dijkgraaf, director of the Institute for Advanced Study in Princeton.
Photo: Guus Schoonewille / HH

Dutch research is a world leader. That requires vision and money, personnel, and a system of knowledge institutions. To foster debate on science policy, the Rathenau Instituut collects facts and figures about such things as expenditure on science and technology in the Netherlands. We also incorporate international studies into our investigations and make international comparisons regarding six themes.

More and more research coordinators at universities of applied sciences

Universities of applied sciences need to appoint 450 additional research coordinators to meet their targets.

Between 2009 and 2016, the number of research coordinators [lectors] at universities of applied sciences increased by a third, from 486 to 646. During the same period, the total income of their research groups doubled, from 102 million to 217 million euros. This is made clear in the factsheet *Praktijkgericht onderzoek hogescholen* [Practice-oriented research at universities of applied sciences]. Lectors are research coordinators who supervise the research groups within which lecturers and external experts conduct practice-oriented research. Their research results are utilised for the further development of the universities of applied sciences and the professional practice of lecturers. There are major differences between individual universities of applied sciences and between programmes. Programmes in healthcare, agriculture, and the arts meet the target of 720 students per research coordinator FTE. Those for teacher training, applied social studies, and technology do not achieve that target. The number of research coordinators is smallest in economics programmes.



Interaction at a university of applied sciences.

Photo: Marcel van den Bergh / HH

“In her vision memorandum (expected this autumn) Minister Van Engelshoven will explain how she believes practice-based research can be improved. One important decision will undoubtedly be whether to focus on having more research coordinators or larger research groups.”

Science Guide, 29 August

276

Average number of new professors each year.

Of them, 52 are female, i.e. 19%.

Factsheet Women in academia, 19 January

42,343

Number of Master's degrees in 2016, 31% higher than in 2009.

Factsheet PhD and Master's degrees, 21 January

14.3 billion

Total amount of R&D investment in the Netherlands in 2016. About half is by businesses.

Factsheet R&D investments in international perspective, 15 February

2.5%

Percentage of GDP that the Netherlands aims to invest in R&D in 2020. That will not be achieved.

Factsheet Two and a half percent, 1 November

Spending on research and innovation lags behind aims

Given the way the Dutch economy is currently structured, we will never achieve the aim of spending 2.5% of GDP on research and development.

Annual Dutch government spending on research and innovation will remain approximately the same until 2022, at EUR 6.5 billion. This figure includes EUR 5.3 billion annually in direct spending and EUR 1.2 billion in tax benefits. More than three-quarters of all direct R&D spending by central government comes from the Ministry of Education, Culture and Science. That money goes mainly to fund basic research at universities. We noted this in our annual report **Total Investment in Research and Innovation 2016-2022 (TWIN)**, based on the National Budget for 2018.

2.5% of GDP

In the EU context, the Netherlands has agreed to invest 2.5% of GDP in research and innovation by 2020. Total

investment in R&D has increased enormously since 1964. Back then, no more than half a billion euros was invested, whereas the figure for 2016 was 14 billion. Research and development expenditure for the Netherlands has ranged between 1.7% and 2% of GDP for more than 50 years now.

To increase this to 2.5% of GDP requires an additional 5.8 billion euros of direct R&D expenditure annually by the Dutch government, companies, and non-profit organisations. The government has already contributed its intended share, but company investment is lagging behind the target. This has much to do with the structure of the Dutch economy; it is not due to the R&D-intensive companies already present, namely the big multinationals, which together carry out some 60% of all corporate R&D in the Netherlands, investing more in R&D than the global average in their sector. The wish to increase R&D intensity to 2.5% of GDP is in fact a call for a change in the economic structure of the country.

Impact

During General Consultations on science policy in the House of Representatives in June 2018, during which the TWIN figures were also discussed, MPs questioned whether the government is investing enough in research. Minister Van Engelshoven believes that the government has taken a major step. She still sees a great deal of potential in private R&D spending, for which the Netherlands scores only modestly in an international context. The Minister for Economic Affairs and Climate Policy, Eric Wiebes, included this point in his R&D strategy (July).



Research in the gait lab at the Máxima Medical Centre and the Fontys University of Applied Sciences. Photo: Marcel van den Bergh / HH

“Are the universities becoming ever-poorer? That is a topic of discussion. Figures from the Rathenau Instituut early this year show that universities have received extra money in recent years. In 2004, the income of the thirteen Dutch universities (excluding the university medical centres) amounted to a total of some 4.2 billion euros. In 2017 the figure was almost 7 billion. However, the number of students also increased considerably over the same period, from about 200 thousand to 275 thousand.”

(De Volkskrant, 13 December)



Part 3

Publications

and figures

This part tells you what we published in 2018, and what people and resources the Rathenau Instituut worked with.

Reports



Prospects for e-democracy in Europe \ 10 January 2018 \ 25 pages

Full title: Korthagen, I. and I. van Keulen (2017). *Prospects for e-democracy in Europe*. The Hague: Rathenau Instituut.

→ Read the report at rathenau.nl/en/kennisgedreven-democratie/prospects-e-democracy-europe



Dutch policy promoting scientific excellence \ Facts & Figures \ 14 February 2018 \ 24 pages

Full title: Scholten, W. and E. Koier (2018). *Dutch policy promoting scientific excellence*. The Hague: Rathenau Instituut.

→ Read the report at rathenau.nl/en/vitale-kennisecosystemen/dutch-policy-promoting-scientific-excellence



Regional innovation \ Facts & Figures \ 5 March 2018 \ 16 pages

Full title: Broek, J. van den, T. Maas and J. Deuten (2018). *Regional innovation*. The Hague: Rathenau Instituut.

→ Read the report at rathenau.nl/en/vitale-kennisecosystemen/regional-innovation



The impact of a doctorate \ 10 April 2018 \ 52 pages

Full title: Koier, E. and J. de Jonge (2018). *The impact of a doctorate – The careers and job prospects of doctorate holders in the Netherlands*. The Hague: Rathenau Instituut.

→ Read the report at rathenau.nl/en/vitale-kennisecosystemen/impact-doctorate



Total Investment in Research and Innovation (TWIN) 2016-2022 \ Facts & Figures \ 23 April 2018 \ 27 pagina's

Full title: Vennekens, A. and J. de Jonge (2018). *Total Investment in Research and Innovation (TWIN) 2016-2022*. The Hague: Rathenau Instituut.

→ Read the report at rathenau.nl/en/vitale-kennisecosystemen/total-investment-research-and-innovation-twin-2016-2022



Robotisering en automatisering op de werkvloer | 2 May 2018 | 120 pages

Full title: Freese, C., R. Dekker, L. Kool and R. van Est (2018). *Robotisering en automatisering op de werkvloer – Bedrijfskeuzes bij technologische innovaties*. The Hague: Rathenau Instituut.

→ Read the report (in Dutch) at rathenau.nl/nl/digitale-samenleving/robotisering-en-automatisering-op-de-werkvloer



Digitalisering van het nieuws | 24 May 2018 | 133 pages

Full title: Keulen, I. van, I. Korthagen, P. Diederer and P. van Boheemen (2018). *Digitalisering van het nieuws – Online nieuwsgedrag en desinformatie en personalisatie in Nederland*. The Hague: Rathenau Instituut.

→ Read the report (in Dutch) at rathenau.nl/nl/digitale-samenleving/digitalisering-van-het-nieuws



Responsible digital health management | 25 May 2018 | 104 pages

Full title: Niezen, M.G.H. and P. Verhoef (2018). *Responsible digital health management – More data, more control?* The Hague: Rathenau Instituut.

→ Read the report at rathenau.nl/en/making-perfect-lives/responsible-digital-health-management



What motivates researchers? | 30 May 2018 | 58 pages

Full title: Koens, L., R. Hofman and J. de Jonge (2018). *What motivates researchers? – Research excellence is still a priority*. The Hague: Rathenau Instituut.

→ Read the report at rathenau.nl/en/vitale-kennisecosystemen/what-motivates-researchers



Valuable Digitalisation | 26 June 2018 | 120 pages

Full title: Est, R. van, E. de Bakker, J. van den Broek, J. Deuten, P. Diederer, I. van Keulen, I. Korthagen & H. Voncken (2018). *Valuable Digitalisation – How local government can play the 'technology game' in the public's interest*. The Hague: Rathenau Instituut.

→ Read the report at rathenau.nl/en/digital-society/valuable-digitalisation



Decent Digitisation | 20 July 2018 | 66 pages

Full title: Hamer, J. and L. Kool (red.) (2018). *Decent Digitisation– Seventeen experts on an ethical digital society*. The Hague: Rathenau Instituut.

→ Read the report at rathenau.nl/en/digital-society/decent-digitisation



Additive bio-manufacturing: 3D printing for medical recovery and human enhancement | 1 August 2018 | 132 pages

Full title: Ferrari, A., M. Baumann et al. (2018). *Additive bio-manufacturing: 3D printing for medical recovery and human enhancement*. European Parliamentary Research Service Scientific Foresight Unit (STOA). Brussels: European Parliament.

→ Read the report at rathenau.nl/en/making-perfect-lives/additive-bio-manufacturing-3d-printing-medical-recovery-and-human-enhancement



Trust in Science in the Netherlands | 28 August 2018 | 55 pages

Full title: Broek-Honingh van den, N. and J. de Jonge (2018). *Trust in Science in the Netherlands*. The Hague: Rathenau Instituut

→ Read the report at rathenau.nl/en/knowledge-ecosystems/trust-science-netherlands



Directed digitalisation | 13 September 2018 | 166 pages

Full title: Kool, L., E. Dujso, and R. van Est (2018). *Directed digitalisation – Working towards a digital transition focused on people and values – The Dutch approach*. The Hague: Rathenau Instituut.

→ Read the report at rathenau.nl/en/digitale-samenleving/directed-digitalisation



The Balance of Science 2018 | 27 September 2018 | 114 pages

Full title: Koens, L., A. Vennekens, R. Hofman, N. van den Broek-Honingh and J. de Jonge (2018). *The Balance of Science 2018*. The Hague: Rathenau Instituut.

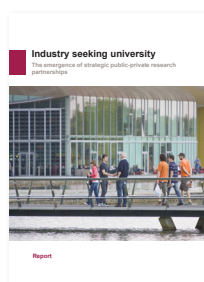
→ Read the report at rathenau.nl/en/knowledge-ecosystems/balance-science-2018



Met gepaste afstand | 2 October 2018 | 117 pages

Full title: Diercks, G., P. Faasse, B. van der Meulen and P. Diederer (2018). *Met gepaste afstand: onafhankelijkheid en integriteit bij onderzoek door rijkskennisinstellingen*. The Hague: Rathenau Instituut.

→ Read the report (in Dutch) at rathenau.nl/nl/kenniseecosysteem/met-gepaste-afstand



Industry seeking university | 10 October 2018 | 115 pages

Full title: Tjong Tjin Tai, S.Y., J. van den Broek, T. Maas, T. Rep and J. Deuten (2018). *Industry seeking university: The emergence of strategic public-private research partnerships*. The Hague: Rathenau Instituut

→ Read the report at rathenau.nl/en/vitale-kennisecosystemen/industry-seeking-university



Excellence is extra-ordinary | 31 October 2018 | 92 pages

Full title: Scholten, W., L. van Drooge and P. Diederer (2018). *Excellence is extra-ordinary – Thirty years of focus on excellence in Dutch science policy*. The Hague: Rathenau Instituut

→ Read the report at rathenau.nl/en/knowledge-ecosystems/excellence-extra-ordinary



Verstandig internationaliseren | 12 December 2018 | 73 pages

Full title: Diercks, G., L. Koens, P. Diederer and P. Faasse (2018). *Verstandig internationaliseren: Nederlands toegepast onderzoek in het buitenland*. The Hague: Rathenau Instituut

→ Read the report (in Dutch) at rathenau.nl/nl/kennis-voor-beleid/verstandig-internationaliseren

Other publications

Digitale democratie kan niet zonder politiek

10 January, news item

Zo laat je burgers online meebeslissen

10 January, Message to Parliament

Zo werkt digitale democratie in Finland: serieuze aandacht

10 January, case

Zo werkt digitale democratie in Melbourne: samen een wiki maken

10 January, case

Zo werkt digitale democratie in Parijs: samen begroten

10 January, case

Sheila Jasanoff: We hebben nederige technologieën nodig

10 January, blog in the "Decent Digitalisation" [Beschaafde Bits] series by Sheila Jasanoff

Draagmoedertoerisme: einde in zicht?

15 January, news item

Rondetafelgesprek over deeleconomie

17 January, news item

Privacy company: EU helpt datadiscussie vooruit

18 January, blog in the "Decent Digitalisation" series by Iris Huis in 't Veld and Arnold Roosendaal

Projectfinanciering en prijzen vergeleken

19 January, news item

Nu tijd voor stakeholderdialoog ultradiepe geothermie

24 January, Message to Parliament

Financiering van onderzoek aan universiteiten

24 January, news item

Het onderzoek aan universiteiten en umc's

25 January, fact sheet

Computer scientist TU Delft: Ingenieurs, zorg dat we de juiste data kunnen delen

29 January, blog in the "Decent Digitalisation" series by Birna van Riemsdijk

Rondetafelgesprek cybersecurity

1 February, news item

Maatregelen voor cybersecurity

1 February, long read

Bouwstenen voor dialoog over kiembaanmodificatie

12 February, article

Overheidsfinanciering van R&D

12 February, data publication

Vrouwelijke gepromoveerden in Nederland

12 February, data publication

Hoogleraar eLaw: Bescherm kinderen online, maar pak hun vrijheden niet af

13 February, blog in the "Decent Digitalisation" series by Simone van der Hof

Niet-bruinende appels, ze zijn al te koop in de VS

14 February, news item

Steeds meer sturing op excellent onderzoek

14 February, news item

R&D-investeringen in internationaal perspectief

15 February, fact sheet

KNVI: Geef IT'ers de ruimte om schending grondrechten te benoemen

19 February, blog in the "Decent Digitalisation" series by Leon Dohmen, Joan Baaijens and Liesbeth Ruoff

Maatschappelijke aspecten van hersenonderzoek en neurotechnologie

22 February, news item

Innovatie in Nederland niet exclusief grootstedelijk

5 March, news item

Naar een innovatiebeleid voor maatschappelijke uitdagingen

5 March, Message to Parliament

Innovatie op de agenda in de Tweede Kamer: hierover gaat het

7 March, news item

Kennisnet: Laat scholen strijd om digitale geletterdheid niet alleen voeren

7 March, blog in the "Decent Digitalisation" series by Remco Pijpers and directeur Toine Maes

Kabinet kondigt onderzoek aan naar aanleiding van 'Opwaarderen'

14 March, news item

Vijf aanbevelingen voor beloftevolle geneeskunde

22 March, news item

Bureau Jeugd & Media: Leiderschap nodig tegen cyberpesten

27 March, blog in the "Decent Digitalisation" series by Justine Pardoën

Experts spreken met Kamer over AI in het recht

27 March, news item

EU: vier uitdagingen voor innovatie in Nederland

9 April, news item

Wat is de mens? Over (biomedische) technologie en 'mensverbetering'

17 April, article

Zo kan de EU innovatie-kloof tussen lidstaten overbruggen

19 April, news item

Uitgaven wetenschap en innovatie blijven achter bij ambities

23 April, news item

Acties voor een verantwoorde digitale samenleving

25 April, news item

Naar een verantwoorde digitale samenleving: van kwesties naar acties

25 April, report on SER and Rathenau Instituut conferences on 6 December 2017 and 25 January 2018

Digitale democratie: #hoedan?

30 April, article

Medialab SETUP: We hebben beschaafde wapens nodig tegen onbeschaafde algoritmen

1 May, blog in the "Decent Digitalisation" series by Siri Beerends

De invloed van robots bij de enige autofabriek van Nederland

2 May, case

Regeneratieve geneeskunde: behandeling van de toekomst?

8 May, article

Marlies van Eck: Algoritmes als een goochelshow; supergaaf maar onbegrijpelijk

18 May, blog in the "Decent Digitalisation" series by Marlies van Eck

Nederland onvoldoende voorbereid op manipulatie van online nieuws

24 May, news item

Personalisatie door zoekmachines

24 May, case

Desinformatie: zo werken bots in Nederland

24 May, case

Desinformatie: zo werken clickbaitsites in Nederland

24 May, case

Kennis voor de samenleving: acht opties voor verbreding van het wetenschapsbeleid

24 May, Message to Parliament

Reactie minister op 'De zin van promoveren'

24 May, news item

Digitale gezondheidsregie vraagt om brede focus

25 May, news item

Hoe houden we vertrouwen in veiligheid?

28 May, article

Aanbevelingen voor verantwoorde digitale regie op gezondheid

30 May, Message to Parliament

Onderzoekers missen tijd voor kennis-overdracht

30 May, news item

Paneldiscussie: kan AI ons menselijker maken?

31 May, news item

Reactie minister op 'Van aap naar beter'

4 June, news item

E-health-experts: Denk niet te gemakkelijk over zelfredzaamheid

5 June, blog in the "Decent Digitalisation" series by Bettine Pluut and Marinka de Jong

Zelfrijdende auto is onderweg

11 June, article

Uitgaven KNAW naar kostensoort

21 June, data publication

Publieke waarden centraal bij digitalisering gemeenten

26 June, news item

Wethouders en raadsleden, durf te vragen

28 June, article

Een eerlijke klusseneconomie

2 July, article

De hybride aardappel: de verwachtingen lopen uiteen

9 July, article

Dolhuys-discussie over digitalisering en gezondheid: volmaakt imperfect

11 July, news item

Technologie voor een inclusieve samenleving

11 July, case

Hoe bedrijven ons met digitale technieken beïnvloeden

16 July, article

In beeld: zo gaan we beschaafd om met digitale technologie

20 July, case

Medische innovaties uit de 3D-printer

1 August, news item

Toekomstscenario: een beroemde neus?

1 August, case

Innovatie: de route van living labs

3 August, case

Blockchain in de gemeente: belofte en praktijk

7 August, case

Spelregels voor sensoren in de publieke ruimte

10 August, case

Europa verplicht vingerafdrukken ID-kaart

17 August, article

Steeds meer lectoren aan hogescholen

29 August, news

Ontwerp blockchains maatschappelijk verantwoord

3 September, article

Digitaliseringsstrategie: dit zijn de knelpunten

10 September, news

Nederland geeft ongericht vorm aan digitale transitie

13 September, news

Film: heeft iedereen toegang tot de digitale samenleving?

13 September, news

Deze digitale kwesties zetten burgers en organisaties sinds 2017 op de agenda

13 September, case

Dit schreven adviesraden over digitalisering sinds 2017

13 September, case

Op deze digitale kwesties focusten ministeries en Kamerleden sinds 2017

13 September, case

Deze digitale ontwikkelingen hielden toezichhouders sinds 2017 in de gaten

13 September, case

Zo veranderde het denken over digitale grondrechten sinds 2017

13 September, case

Online democratie, wat heb je er aan?

27 September, news

100 Jaar onderwijs, cultuur en wetenschap

27 September, news

Over mogelijkheden, wensen en 'onvermijdelijke keuzen'

27 September, chapter in In de regel vrij: 100 jaar politiek rond onderwijs, cultuur en wetenschap (OCW, 2018)

Nieuw onderzoek: hoe werken universiteit en bedrijf samen?

1 October, news

Onafhankelijk onderzoek gedeelde verantwoordelijkheid

2 October, newss

Nieuw onderzoek: hoe meet je de impact van grote research-centra?

5 October, news

Nieuw onderzoek: de kennisbasis van het ministerie van IenW in beeld

9 October, news

De kansen van digitale burgerbegrotingen

16 October, article

Zo werken provincie, twee universiteiten, een ziekenhuis en een chemiebedrijf samen

17 October, case

Drie manieren om wereldwijde problemen lokaal te bespreken

18 October, news

Algen: fabriekjes van de toekomst?

19 October, news

Verschillen overbruggen tussen universiteit en ASML

23 October, case

De taak van publieke kennisorganisaties in Nederland

24 October, news

Nieuwe mogelijkheden voor Bosch en UvA

25 October, case

Twee en een half procent

1 November, fact sheet

Gerdi Verbeet: Vertrouwen in de democratie is goed, meedoen is beter

8 November, news

Rondetafelgesprek over de toekomst van het medialandschap

19 November, news

Kenniseconomie vereist debat over rol grote bedrijven

19 November, article

Verslag conferentie: onderzoek met impact

21 November, news

Toekomstscenario's voor de politiek

22 November, news

Viktor Mayer-Schönberger en Melanie Peters over de kracht van data

27 November, news

Samen strijden tegen nepnieuws

28 November, news

Nieuwe regels voor kunstmatige intelligentie?

29 November, article

Nadenken over innovatie voor en door de overheid

4 december, nieuws

Open access van wetenschappelijke publicaties

5 December, fact sheet

Verstandig internationaliseren: Nederlands toegepast onderzoek in het buitenland

12 December, Message to Parliament

Two and a half percent

18 December, fact sheet

Los het tekort aan eicellen niet op met schimmige handel

19 December, article

Het jaar in acht kabinetsreacties

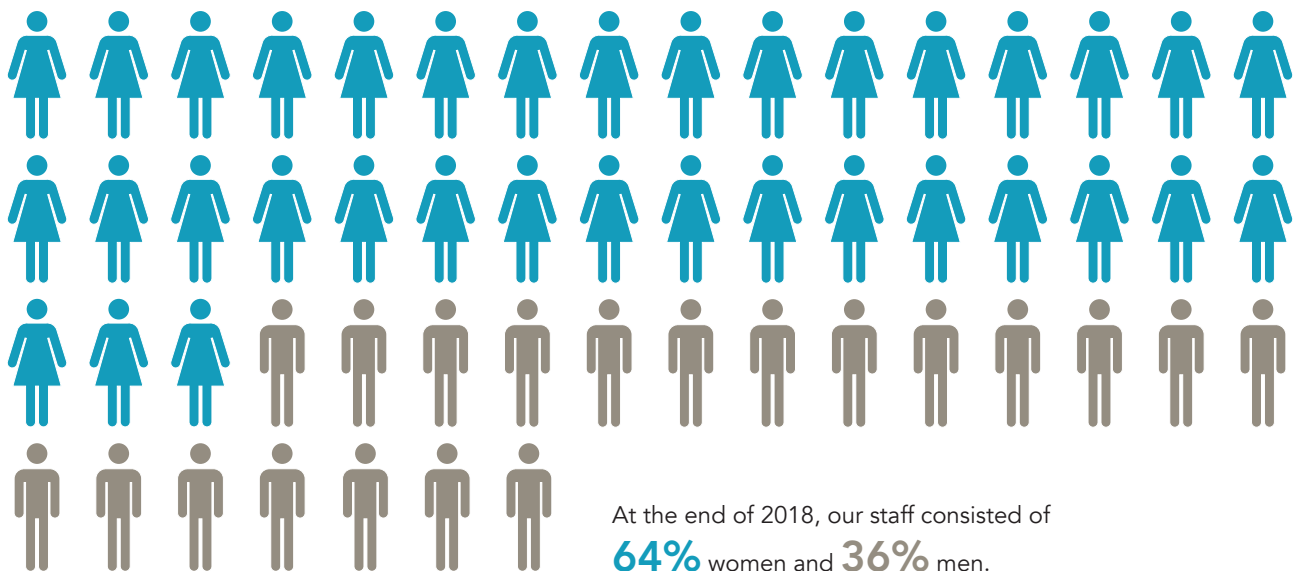
19 December, article

Deze vier thema's onderzoeken we in 2019 en 2020

27 December, news

Annual Social Review

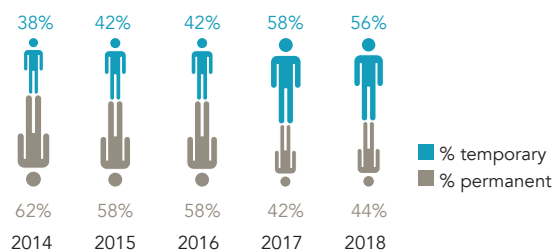
On 31 December 2018, we employed **55** people (47.58 FTEs). At the end of 2017, that figure was 52 (45.28 FTEs).



7 employees left the institute. They had worked in the Research & Dialogue (**6**) and Communication (**1**) departments.



10 employees joined us in 2018. They work in the Research & Dialogue (**9**) and Operations & Support (**1**) departments.



The percentage of employees on a permanent contract is **44%**.

In 2018 we had **8** interns.



Our absenteeism rate was **2.28%**. In 2017 the figure was **3.22%**.

Financial Annual Review

Income 2018

In 2018, the Rathenau Instituut's income amounted to k€ 5166, k€ 115 less than budgeted for. The Ministry of Education, Culture and Science provided a lump sum of k€ 4346 via the Royal Netherlands Academy of Arts and Sciences (KNAW). That accounted for 84% of total income (previous year: 88%). This includes the non-budgeted allocation of wage and price compensation. The other additional revenues are mainly staff revenues such as attendance fees. The institute was successful in obtaining external funding, particularly in the second half

of the year. This resulted in higher revenues (+k€ 258) than last year. Compared to the budget for 2018, that was -k€ 228. Contract income for 2018 came from 31 externally funded projects. The funds came, inter alia, from the EU's H2020 and STOA projects and from national projects for the Ministries of the Interior and Kingdom Relations, Education, Culture and Science, and Infrastructure and Water Management. In addition, a number of small contracts were carried out. Income from external contract projects was 18% of the lump sum.

Income (in * EUR 1000)	Actual	Budgeted	Difference
Contribution from Ministry of Education, Culture and Science	4346	4227	119
External funding	783	1011	-228
Other income	37	43	-6
Total income	5166	5281	-115

Year (in * EUR 1000)	2014	2015	2016	2017	2018
Total income	5166	4911	4864	4807	5166
Total contribution from Ministry of Education, Culture and Science	4351	4135	4157	4241	4346
External funding	776	687	660	525	783
External funding compared to contribution from Ministry of Education, Culture and Science	18%	17%	16%	12%	18%

Expenditure 2018

Total expenditure amounted to k€ 5096. That is less (k€ 830) than foreseen when the budget was drawn up. Personnel costs were lower (-k€ 673): vacancies from the 2018 budget that were linked to future external income were filled later in 2018 than budgeted. In addition, a

change in the design of a number of projects led to a reduction in staffing requirements. Material costs for operations were also lower (k€ 34). The projects were carried out at lower cost (k€ 123).

Expenditure (in * EUR 1000)	Actual	Budgeted	Difference
Staff costs	3901	4574	-673
Project costs	489	612	-123
Material costs	706	740	-34
Total expenditure	5096	5926	-830

Note: The annual financial statements for the Rathenau Instituut are consolidated in those of the Royal Netherlands Academy of Arts and Sciences, and as such are included as part of the Academy's Annual Report.

The Board

Gerdi Verbeet \ Chairs the National 4 and 5 May Committee and is a supervisory director of, inter alia, the charity organisation Novamedia.

Prof. Emile Aarts \ Rector Magnificus of Tilburg University (resigned from membership of the Board as of 1 February 2018)

Prof. Wiebe Bijker \ Professor of Technology and Society at Maastricht University and at the Norwegian University for Science and Technology in Trondheim.

Prof. Madeleine de Cock Buning \ (Board member since 1 September 2018) Chair of the Dutch Media Authority. Professor of Copyright and Media Law at Utrecht University and Professor of Digital Politics, Economy & Societies at the European University Institute, School of Transnational Governance in Florence, Italy.

Prof. Roshan Cools \ Professor of Cognitive Neuropsychiatry at Radboud University Medical Centre.

Dr Hans Dröge \ Supervisory director for the Brabant Development Agency.

Edwin van Huis \ Director of Naturalis Biodiversity Centre, Leiden.

Prof. Erwin Muller \ (Board member since 1 September 2018) Dean of the Faculty of Governance and Global Affairs (FGGA) at Leiden University in The Hague and Professor of Safety, Security and Law at the same faculty. Also Director of Leiden University's campus in The Hague.

Prof. Marijk van der Wende \ Distinguished professor of Higher Education at Utrecht University's Faculty of Law, Economics and Governance.

Prof. Peter-Paul Verbeek \ Professor of Philosophy of Technology, University of Twente.

Dr Melanie Peters (secretary) \ Director of the Rathenau Instituut, The Hague.

For an up-to-date overview of the positions and ancillary positions occupied by the members of the Board, see www.rathenau.nl/en/about-us/who-we-are/our-board

Programme Panel

Gerdi Verbeet chairs the National 4 and 5 May Committee and is a supervisory director of, *inter alia*, the charity organisation Novamedia.

Annet Aris teaches digital strategy at INSEAD Business School in France and is a supervisory director of a number of companies.

Marien Baerveldt builds innovative learning communities at Utrecht University and is a team and process supervisor at Hosted Beings.

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Dr Rob Bijl is the deputy director of the Netherlands Institute for Social Research (SCP).

Marc Chavannes is a journalist with De Correspondent, former editor and foreign correspondent of NRC Handelsblad, and emeritus professor of journalism at the University of Groningen.

Felix Cohen is, *inter alia*, chairman of the Supervisory Board of the Regina Coeli languages institute and former director of the Dutch Consumers' Association.

Willem Deetman was, *inter alia*, chair of the board of the Kloosterkerk in The Hague.

Dr Linda Duits is a researcher and publicist, and a lecturer in Media Studies and Gender Studies.

Bas Eickhout is a member of the European Parliament.

Bert Fokkema is part of an international team at Shell that develops policy and internal standards for the decommissioning of oil and gas production systems.

Yuri van Geest is, *inter alia*, the founder of ExOxo (corporate transformation) and co-author of the bestseller *Exponential Organisations*.

Peter Giesen is an editor and commentator for national newspaper De Volkskrant.

Joana Gomes Neto is a student member and a Master's degree student in Molecular Biology & Biotechnology at the University of Groningen.

Prof. Rob J. Hamer is Vice-President Agrifood External Affairs at Unilever NL N.V. and Extraordinary Professor of Food Chemistry at Wageningen University & Research.

Rob van Hattum is science editor-in-chief for the Dutch public broadcaster VPRO.

Dr Janneke Hoekstra is head of the Faculty of Engineering at HAN University of Applied Sciences.

Yori Kamphuis is co-founder of Coblue and Storro.

Dr Annette Klinkert founded the firm of city2science.

Laurien Koster is the independent chairperson of the Children's Rights Collective and a supervisory director at Oxfam Novib.

Chris Kuijpers is the director-general for Governance and Housing at the Ministry of the Interior and Kingdom Relations.

Willem Lageweg holds a number of board and supervisory positions, for example with Triodos Bank, Close the Gap, and the Institute Positive Health.

Dr Dirk Pilat is deputy director of the Science, Technology and Innovation Directorate of the Organisation for Economic Co-operation and Development (OECD) in Paris.

Jeanine van de Wiel is Global Regulatory Affairs Manager at DSM for food ingredients and health.

Lynn Zebeda is the co-founder of the Dr Monk innovation studio.

Dr Melanie Peters (secretary) is the Director of the Rathenau Instituut, The Hague.

The Rathenau Instituut supports the formation of public and political opinion on the socially relevant aspects of science and technology. It conducts research and organises discussion of science, innovation, and new technologies.

[**www.rathenau.nl**](http://www.rathenau.nl)

Rathenau Instituut