

Annual report 2015

Rathenau Instituut



Contents

















This Annual report presents some of the highlights of our work in 2015. The full Annual report 2015 is available at www.rathenau.nl/ jaarverslag2015

- 4 Introduction Democratic science: a vision realised
- 6 The quantifiable self 'Putting the digital patient first'
- 10 Smart society 'We will all be affected by this automation trend'
- 14 Responsible science 'Bringing science and society closer together'
- 17 Chair in Evidence for science policy'Hard data alone is not enough'
- 18 Innovation without borders 'The national and regional governments would do well to present themselves as one major knowledge hub'
- 22 Science in figures 'We shed light on the state of science in the Netherlands'
- 26 Improving policy through research 'Public trust should not be taken for granted'
- 30 2015 in figures
- 33 Publications

Witness to changing times



My mother used to tell me about all the great technological advances of her day. The telephone, the wireless, the automobile, the aeroplane: they changed her life. But I, too, am a witness to changing times. As a schoolgirl I wrote with a dip pen, not long after the days of writing slates in the classroom. A generation later, a computer lurked, unused, in my son's classroom, hidden under a rug with a potted plant perched on top. Now, my grandchildren use their iPads every day, and instead of a blackboard, they give PowerPoint presentations on a whiteboard, complete with audio and moving images.

New technologies offer boundless possibilities. That fascinates and inspires me. Computers are becoming smarter and more versatile all the time, beating some of the best chess grandmasters at their own game. Smart software makes buy-andsell decisions on the stock exchange. Robots pack eggs into boxes, pick fruit and make pizzas. Leafing through a cookbook is a thing of the past; just type a few ingredients into your tablet and the perfect recipe pops up. We can track our own health status with mobile apps, and driverless cars and personal care robots are just around the corner.

But just because something is possible, doesn't make it right. The Rathenau Instituut facilitates dialogue between politicians, scientists and society at large about the issues raised by science and technology. So with health apps, for example, it's important to put extra safeguards in place to protect our privacy. And everyone should be able to benefit from new technologies. Last year, at the request of the Lower House, the Instituut published a report about robots and labour. It concluded that in the spirit of Gerhart Rathenau's historic PC-privé project, there should be a new robot-privé project to familiarise a new generation with the latest technology.

As an MP I have always advocated evidencebased policymaking, so I am delighted to see the Dutch Parliament making active use of scientific evidence. I was fascinated by the 'Dialogue between Science and Society' conference hosted by the Rathenau Instituut last summer as part of the National Research Agenda. The transparency with which the academic and scientific communities reflect on their own work is impressive, as is the keen interest in science shown by the general public: ordinary citizens submitted nearly 12,000 questions to the scientific community. The public must always be able to depend upon the work of scientists, who are themselves deeply aware of their responsibility. This public trust in science, according to the Rathenau Instituut's publication, Vertrouwen in de wetenschap 2015, ('Trust in Science in 2015') remains solidly high.

Gerdi A. Verbeet, Chair of the Board of the Rathenau Instituut

Democratic science: A vision realised

Gerhart Rathenau was a true visionary. Back in the 1980s, when press releases were sent by post, letters to the editor were the height of interaction, and the general public was seen but not heard, Rathenau believed that every citizen should be fully engaged in debates triggered by advances in science and technology. Named in his honour, our institute has been pursuing "democratic science" ever since.

Democratic science is more than an ideal: in our high-speed, high-tech information society, it's nothing short of an economic imperative. Businesses, researchers and even students need to consider the social and ethical implications of their findings from the outset. In 2015, we involved all of these groups in our new research into nanotechnology, synthetic biology, antibiotics and hybrid potatoes.

Working on the robot society

In 2015, the Dutch House of Representatives commissioned the Rathenau Instituut to look at whether digitisation and robotisation would lead to job losses. We showed, in our study, *Werken aan de Robotsamenleving* (Working on the Robot Society, see page 12), that major new technologies create opportunities for major new support initiatives. When the personal computer emerged in the early 1980s, Gerhart Rathenau – keenly aware of the importance of protecting jobs – placed education front and centre. Right from the start, anyone curious could access a computer, at home or in the workplace, through Rathenau's pioneering PC-privé project. The Dutch got a head start in developing computer skills, and to this day, because of Rathenau's forward thinking and a political openness to his ideas, the Netherlands retains a computing advantage over many other countries.

Trust in science

Rathenau's vision of democratic science became a reality in 2015, in the formation of science policy. For the first time in history, the Dutch public was asked to help shape the National Research Agenda, by identifying key topics for scientists and scholars. The Rathenau Instituut played its part, hosting a conference for stakeholders and scientists in The Hague, and reporting on its outcomes (see page 15).

Scientists have recently been working increasingly with their peers, on a multidisciplinary basis, to address the major social issues of our time: energy supply, food scarcity and cultural tensions. These profoundly urgent socio-political problems need solutions we can trust. In 2015 we showed, in our survey, Trust in Science (see page 28), that the Dutch public places a high degree of trust in science, along with very high expectations.

Politicians and policymakers are developing a growing interest in science, and meanwhile, there is increasing demand for effective science policy. Over the course of 2015, the Rathenau Instituut supported politicians and policymakers at national and European level in assessing the significance of the latest scientific advances.



| Melanie Peters, Director, Rathenau Instituut

Such support would be impossible without reliable facts and figures, so we launched a user-friendly landing page on our website, with all the latest facts and figures on academic research (see page 24). Naturally, our team of experts is always on hand to provide detailed information on request.

Cooperation

2015 was a year of cooperation for the Rathenau Instituut. We worked closely with the Royal Dutch Academy of Arts and Sciences to strengthen our mutual management processes, and to refine the synergy in terms of the activities we undertake. Here at the Rathenau Instituut we established a Programme Board drawn from the business community, journalism, NGOs and various international organisations. We also hosted a well-attended symposium on the public importance of science journalism, working with science journalists and communications experts, our vital partners in realising Rathenau's vision of public debate.

2015 saw the completion of the PACITA project, in which we collaborated with 15 peer institutions across the European Union to strengthen evidence-based policy on science, technology and innovation. The themes included hot topics such as big data, nanotechnology in nutrition, artificial intelligence and privacy in genomics. On the basis of such expertise we were well-placed to share international best practice with members of the Dutch Senate. With regard to the potential establishment, for example, of a State Committee for Reassessment of the Parliamentary System, we reported on experiments in the British House of Lords with the use of digital media for direct public consultation (*Kansen en dilemma's van de digitale democratie /* Opportunities and Dilemmas in Digital Democracy).

Six themes

This Annual Report is the first in which the work of the Rathenau Instituut is divided into six clear categories (with some projects coming under more than one heading), making it possible to present our work more coherently. The coordinator for each of the themes reports below on our contribution over the year to the relevant debates, involving politicians, policymakers, members of the public and researchers.

Expertise

Back in the 1980s, Gerhart Rathenau declared that if politicians were to make effective decisions about science and technology, they would need relevant, reliable information. He called for the harnessing of expertise and the adoption of a bold new outlook to bridge the gap between society and science and technology. These became the Rathenau Instituut's founding principles in 1986. Thirty years later, we can celebrate three decades of expertise and dialogue, bringing science, politics and society together. *Democratic science* is, at last, a vision realised.



Theme 1: The quantifiable self

Apps, smartphones and social media: technology plays an increasingly important role in our lives. There are many advantages to this trend, with convenience, safety and independence being just a few. But who, exactly, has access to all this data, and who stands to profit from it? Is our freedom being curtailed? The Rathenau Instituut aims to discuss the impact of this technological revolution, placing it on the political and societal agenda.

The quantifiable self

When it comes to innovation in healthcare, the government and the corporate sector should boost the use of technologies that put the patient first. As an e-book called De meetbare mens ('The quantifiable self') shows, this is currently not the case.

The results of electronic lifestyle surveys, online journals kept by diabetics, electronic patient files, medical data and tissue samples from clinical studies and biobanks: these can all be classified as sensitive personal data. But we are increasingly expected to measure ourselves and share our data electronically.

It helps us to monitor and manage our health, in some cases without the intervention of a medical professional. This has given patients extra time, convenience and greater freedom, and it can potentially reduce healthcare costs. In the next few years, The Dutch Minister of Public Health, Welfare and Sport aims to invest substantially in consumer apps and other e-health applications to help us improve our lifestyles and prevent illness.

The technology companies and scientists who are to facilitate this in healthcare innovation take

a great interest in our health-related data – but not necessarily in our health. We have no direct relationship with these companies or scientists, so we have no idea who might be looking at our sensitive data. But health-related data is a marketable commodity, and therein lies the problem, according to theme coordinator Ingrid Geesink of the Rathenau Instituut. For The quantifiable self project, she collected nine practical examples of electronic measurements of the sick and healthy body.

Vulnerable patients

"In the past," says Ingrid Geesink, "we would share information about our health in the privacy of the doctor's surgery. The relationship between doctors and patients is carefully regulated: there are strict rules and laws in place, including doctor-patient confidentiality and *informed consent*, i.e. the rule that patients must give official permission for their data to be used for scientific research. The rules ensure that anyone can freely contact a medical professional and that patients can be completely open with their practitioners. This is important, since patients are vulnerable and there is a power imbalance between the sick person and the medical professional. Patients need to be secure in the knowledge that a doctor is acting in their interest."

Big data revenue models

The e-book reveals that the digitisation of healthcare has blurred the lines between the medical field and the consumer market since tech companies have entered the health market. Many technologies used to check people's health were originally developed for consumers rather than patients, and many of these new companies do not treat patients directly. According to Ingrid Geesink, "This presents a problem, because it means the individual's interests and the patient's wellbeing have taken a backseat to revenue models from the world of marketing and big data. It essentially turns the patient into a source of medical data."

One minute body scan

In order to raise awareness of this issue among the public, the Rathenau Instituut was represented at several festivals in 2015 with an art installation called the 'One minute body scan'. This device took pictures of visitors and compiled a profile on this basis. "The body scan was a huge success", says Ingrid Geesink. "Several hundred people spent up to 90 minutes queuing to discover which of the profiles best described them: were they Couch Potatoes, Cosmopolitan Hipsters or Career Pursuers? We wanted people to experience what it's like to be measured and become aware of the impact of such measurements. At first the visitors were mostly curious and keen to find out more, but we found that many people were a little thrown off-balance by the time they'd taken the scan. That was exactly our intention, because the whole point of The quantifiable self project is to encourage people to think about the practice of measuring sickness and health and to encourage a public debate on this topic."



What's new?

The Rathenau Instituut aims to place the impact of the technology revolution on the political and social agenda and to incite patient organisations, developers and the government to take action. The Rathenau Instituut will conduct a follow-up study on medical data in 2016. What is the economic value of this data and how do companies use it?

Ingrid Geesink, theme coordinator for The quantifiable self project



The Rathenau Instituut was represented at several festivals in 2015 with an art installation called the 'One minute body scan'. "The body scan was a huge success", says Ingrid Geesink, theme coordinator. "We wanted people to experience what it's like to be measured and become aware of the impact of such measurements."



Theme 2: Smart society

In many industries, science and technology are used to make processes run more effectively and efficiently and make them more sustainable. As part of the Smart society theme, the Rathenau Instituut is investigating how innovations can help move society forward.

'We will all be affected by this automation trend'

Summer 2015 saw a lively debate in the Netherlands on the impact of robotics and sophisticated forms of automation on our society. This debate was sparked in part by the report 'Working on the robot society', which the Rathenau Instituut was commissioned to write by the Dutch House of Representatives.

In a Letter to Parliament, Minister Lodewijk Asscher of Social Affairs and Employment praised the institute, singling out the report and roundtable meeting in the House of Representatives and calling them 'extremely valuable'.

"There used to be this notion," says theme coordinator Rinie van Est, "that even though new technologies would result in job losses, they would be replaced with new jobs in



Rinie van Est, theme coordinator for the Smart society

other industries. The report 'Working on the robot society' shows that consensus among economists about this subject has been on the wane since 2010. A variety of simple administrative duties have been automated since 1980, but this is now also being done for more complex activities, such as writing news items or diagnosing illnesses. The current automation trend - and this is a new development - will affect everyone, irrespective of their level of education or the industry in which they are employed. However, it would be too simple to say that robots are "taking over our jobs." We feel that policymakers and politicians should take things one step further: new technology is also changing the way we organise our work, and of course the work itself is changing as well."

Digital platforms such as Uber, Facebook and Airbnb are using smart software to match supply and demand, operating in a global market. Moreover, these companies let us, their customers, do more and more things ourselves. As Van Est says: "We are providing the content for platforms such as Facebook or Youtube, and we are doing that free of charge. On top of that, we now have to scan our own groceries, we book our taxi journeys online and have to print out our own airline tickets."

The study also shows that we are dealing with new and other types of labour relations. Internet start-ups and large tech companies do not employ many permanent employees or have a lot of business assets. With cognitive tasks being fragmented and automated, this work can also be outsourced to machines or independent contractors. The ranks of independent contractors were already growing in the construction industry, mail delivery and journalism, but bankers, civil-law notaries, auditors and tax inspectors will also need to start changing the way they work – or even switch careers altogether.

Not waiting passively

"It's clear that we should not sit back and wait for something to happen," says van Est. "All members of the Dutch public – private citizens, politicians, teachers, employers and employees – will need to learn more about robots. Experience has shown that there are three factors that help us prepare for the future: innovation, good education and the distribution of wealth. The robot society should be something to aspire to for us all." At a conference for NRC Live, where other speakers included the aforementioned Lodewijk Asscher and MIT Professor Andrew McAfee, Rathenau Instituut director Melanie Peters advocated a national 'private robot' project (in the same vein as the PC project of the 1980s) and argued the merits of teaching coding in schools. All these ideas got the Twitterverse buzzing.

The 'Working on the robot society' project had a major impact, with all national media outlets covering it, and it was cited in the Parliamentary Papers. "I'm very happy that everyone is picking up on our message," says van Est, "for which I should also credit several op-ed pieces that appeared in the Trouw and Volkskrant newspapers and a longer article about robots which we published on our website. Our research has not only raised awareness among the public, but also enables them to do something constructive, in their own industry or sector. We get very regular requests for interviews and speeches, and representatives from all the ministries have visited the institute. We've also had visits from organisations such as the Dutch Insurers' Association, the banking industry, the Social and Economic Council, members of the judiciary, civil servants and individual Members of Parliament: everyone is actively looking for information about the robot society."

Minister Asscher called the report and the roundtable meeting in the House of Representatives "extremely valuable". Brigitte van der Burg, chair of the Parliamentary Committee for Social Affairs and Employment, also lauded the report: "The close relationship between science and politics has once again proved its immense value."

What's new?

In 2016 the institute was commissioned by the Stichting Management Studies to conduct further research into robotisation in the Dutch business sector. The institute is also exploring the robotisation of the agricultural industry ('smart farming') and automation in urban areas.

Following a motion by the Dutch MP Ada Gerkens of the Socialist Party, the Rathenau Instituut is investigating the merits of establishing an advisory committee devoted to the ethical aspects of the digitised society.

In 2016 the institute will host a conference on synthetic biology. The combination of digital, nanotechnological and biological information enables scientists to build new biological systems using genetic material. Do environmental organisations accept this form of technology if there is something to be gained in terms of sustainability?

Theme 3: Responsible science

It is not easy to direct scientific research even with targeted policies, and it is not always clear how policy measures impact research practices. The Rathenau Instituut identifies the effects of policy measures, using facts and figures and innovative analyses.

'Bringing science and society closer together'

Immunologist Jon Laman of Groningen University is researching *perianal dermatitis*, an irritating skin condition for which there is currently no cure. He is developing a cream that contains a large amount of protease inhibitors, and it so happens that a potato-processing company called AVEBE can supply these inhibitors, so the two companies decide to team up.

Another example: a researcher has produced a picture book featuring strong, large and smart heroes in order to familiarise toddlers with the abstract concept of "healthy eating". Then there is the expert on Mayan civilisation who creates an exhibition and a book and conducts interviews to show that the Mayans never actually predicted the end of the world.

- Ander Baller

33

These are just a few examples that illustrate how academic and scientific research contributes to society. These examples are lifted from the popular longread, 'Valorisatie: onderzoekers doen al meer dan ze denken' ('Valorisation: Researchers already do more than they realise'), published by the Rathenau Instituut. Over the past few years, the institute has investigated the outcomes of a decade of valorisation. It concluded that many scientists feel that the societal impact of research results is a somewhat abstract idea, and it turns out many researchers are inadequately informed about the many opportunities offered by valorisation.

Successful workshops

"In order to help researchers think about impact, we organised a number of training courses and workshops following the research study," says theme coordinator Edwin Horlings. "These workshops were highly successful. We now receive requests, also from abroad, to share our recommendations with both researchers and policymakers." The research study even led to a PhD: on September 10th, 2015, Stefan de Jong earned his doctorate from Leiden University. The title of his thesis was: 'Engaging Scientists: A Survey in the Netherlands'.

National Research Agenda

For the National Research Agenda, an initiative launched by the Dutch national government to promote cooperation between scientists, members of the public and the business sector, the Rathenau Instituut assisted with the classification and analysis of 11,700 questions posed by members of the public to the scientific community. The institute also organised the conference 'Dialogue between Science and Society'. Around 300 people gathered together in The Hague in 2015 in order to provide advice about research questions for scientists in the coming years. Participants cited values such as quality of life, privacy, spirituality, curiosity, creativity, a vital democracy and social equality as being important to our society, indicating that they would like to see these values reflected in scientific research. Conference attendees also learned that involving a large number of people in science and actively seeking social angles should be an ongoing process.

"There is a clear need for continued feedback on the results from the National Research Agenda, and to use the knowhow available in society among members of the public and professionals. >



Edwin Horlings, theme coordinator for Responsible science



The conference 'Dialogue between Science and society' attracted more than 300 people.

Research that factors in public opinion is more readily approved by the public and used in society," said Melanie Peters of the Rathenau Instituut. She presented the findings of the conference toBeatrice de Graaf and Alexander Rinnooy Kan, the chairs of the National Research Agenda. Minister Jet Bussemaker of Education, Culture and Sciences, the initiator of the National Research Agenda, showed enthusiasm about the movement that has emerged to bring science and society closer together.

Future of the university

In October 2015, the Rathenau Instituut published a report titled *Keuzes voor de*

toekomst van de Nederlandse Wetenschap ('Future choices for Dutch Arts and Sciences') about the strategic decisions, opportunities and threats relating to arts and sciences in the Netherlands.

The publication shows MPs and policymakers at a glance the policy options available and what impact they have on various future scenarios. In November Barend van der Meulen, Head of Research at the Rathenau Instituut, spoke on this issue at the hearing 'Strategic Agenda for Higher Education and Research' of the House of Representatives. Through this report, the Rathenau Instituut supports the debate on the future of the Dutch arts and sciences.

What's new?

In 2016 the Rathenau Instituut will be hosting an international conference on science policy relating to excellent research.

'Hard data alone is not enough'

Take the debate about performance targets and the mentality prevalent at universities to think in terms of economic profit, or concerns about the poor career prospects of many researchers. We are seeing a growing discussion on sciencerelated topics. According to Barend van der Meulen, Head of Research at the Rathenau Instituut, "Reliable data on national scientific performance and the implications of various policies is essential."

An expert in scientific policy, Barend van der Meulen was appointed as Professor of Evidence for science policy at Leiden University in October 2015. The chair was established by the Rathenau Instituut with the objective of improving research on the impact of policies on scientific and academic practice. "The growing importance of science for society and the economy has also increased the importance of science policy," says van der Meulen. "In recent years, political leaders and the media have also turned their attention to academic and scientific research and to the organisation of research. This means that reliable data on scientific performance and the implications of policy is essential."

Strong reputation

The Rathenau Instituut has built a solid reputation in recent years through its policy-focused analyses. According to van der Meulen, "Many people, when they hear the word 'evidence', only think about hard data. But part of the Rathenau Instituut's responsibility as an information provider – and it presents data on its website in a way that can be understood by a lay audience – is placing this data in the right context. Our own research into evidence-based policy shows how misleading it can be to think that data alone is sufficient. When the crunch comes, you require a mix of quantitative and qualitative studies, with room for different ideas."

Variety of perspectives

With publications about scientific and talent development policy, valorisation and the future of universities, the Rathenau Instituut showed that this wide-ranging research can be systemised. "What the various reports published by our institute have in common is that we show a variety of perspectives", says van der Meulen. "The name of the academic chair 'Evidence for science policy' therefore refers to various types of evidence that exist alongside each other." Rathenau Instituut Director Melanie Peters, is pleased with the chair: "It provides us with even more opportunities to further develop our scientific methods. This helps us to continuously improve the quality of information provided to the public and political leaders."



Barend van der Meulen

A Innovation without borders

Theme 4: Innovation without borders

Research and innovation are not confined to national and regional borders, and scientific practice has traditionally been an international activity. We are also seeing closer partnerships between research and educational institutions, the corporate sector and governments. This is concurrent with another trend: the growing interest in science policy (and science financing) from the European Commission. As part of the work programme theme 'Innovation without borders', the Rathenau Instituut is investigating the impact of these trends on national science policy.



'Dutch national and regional governments would do well to present themselves as one major knowledge hub'

In the much-discussed report 'R&D goes global', the Rathenau Instituut demonstrated that Dutch businesses are spending an increasing amount of money outside the Netherlands. In order to attract foreign companies to invest in Research and Development in the Netherlands, the Dutch national and regional governments should form an alliance.

The Rathenau Instituut noted that Dutch companies are spending a growing share of their budget on R&D (Research and Development) abroad, while R&D investments by foreign businesses in the Netherlands have lagged behind. The 'R&D goes global' report shows that companies, when it comes to their development (i.e. product development), tend to opt for areas offering good market opportunities, often in countries with fast-growing economies, such as those found in Asia. However, for their research activities, companies want to be based in places



Jasper Deuten, theme coordinator for the Innovation without borders project

with easy access to knowledge, talented researchers and opportunities for cooperation in research. The Netherlands can use this to its advantage when competing at international level by facilitating a strong knowledge infrastructure.

Joining forces

According to theme coordinator Jasper Deuten, "We conducted long interviews with both managers of large companies and policymakers. Based on the information gathered, we concluded that the national government and regional governments should work together on increasing the appeal of the Netherlands for R&D investments. In order to get companies to invest in research, you need to have a number of competitive regional hubs. In order to be able to compete with surrounding metropolitan areas, the Netherlands should also present and organise itself more as one major knowledge hub." The report 'R&D goes global' attracted a great deal of media coverage and also made an impact in the political world. Dutch news daily Het Financieele Dagblad covered it extensively, including in an editorial ("The timing couldn't be



The globalisation of Research & Development does not just constitute a threat to the Netherlands, but provides opportunities as well.

better... The plea to focus more on attracting foreign companies to the Netherlands that are interested in investing in R&D is commendable.") Business TV talk show RTL-Z also devoted an item to it, with economist Mathijs Bouwman providing a good summary of the research. In October 2015, the standing Parliamentary Committee on Economic Affairs discussed the report during a general meeting on corporate policy and innovation. Minister Henk Kamp responded to the report in a Parliamentary Letter.

"Apart from giving a lot of interviews," says Deuten, "I also gave lectures on the report at ministries, the Royal Institute of Engineers and Amsterdam Science Park. We gathered from the public that our message – namely, that Research & Development each have their own dynamic and merit their own policy strategy – was enlightening. The globalisation of R&D does not only constitute a threat to the Netherlands, but provides opportunities as well."

Evaluation procedures

In 2015 the Rathenau Instituut also drafted a set of evaluation procedures for the six organisations for applied scientific research in the Netherlands; these are organisations that conduct academic and scientific research on behalf of businesses and governments. The following organisations were included: the Netherlands Organisation for Applied Scientific Research (TNO), the DLO institutes, Deltares, ECN, and MARIN and NLR. "There was already a set of evaluation procedures in place for academic research," says Deuten, "but they turned out not to be suited for the evaluation of applied scientific research. In drafting these procedures, we worked closely with organisations for applied scientific research, the Ministry of Economic Affairs, and other specialised ministries. This project is a good example of the added value of the independence and impartiality of the Rathenau Instituut."

What's new?

In 2016 the Rathenau Instituut will conduct research on innovation in regional hubs, places where businesses and research and educational institutions work with other organisations on producing research and innovation. We will also be looking at the role of universities of applied sciences in the dynamics of regional innovation. The role of universities of applied sciences has tended to be underestimated in national research and innovation policies.

The Rathenau Instituut will also publish a Facts & Figures report on the position of the Netherlands within the European Research Area. In addition to being a key financier of research in the Netherlands, the European Commission also plays a significant role in placing scientific research on the agenda, and in organising and conducting such research.

Science in figures

Theme 5: Science in figures

The Rathenau Instituut provides access to data on research and science through reports, its annual publication 'Facts & Figures' and its website. At the request of the Ministry of Education, Culture and Sciences, the Rathenau Instituut will further expand this research and information role in the coming years. With scientific and academic research becoming an increasingly international endeavour, we are expanding our scope of operation by using the findings of international studies and making international comparisons.

23

'We shed light on the state of science in the Netherlands'

How much money does the government invest in science? How many university lecturers are there in the Netherlands and where are they from? How much faith do people have in science? The answers to these questions start with the facts and figures provided by the Rathenau Instituut.

"During a general meeting on scientific policy held in 2015, ministers and MPs across the political spectrum made reference to our reports. It just goes to show that our data provides the foundation for the national debate on science." So says Jos de Jonge, coordinator for the theme 'Science in figures' at the Rathenau Instituut. He and his colleagues collect, organise and analyse data relating to science in order to improve understanding of how science works. The institute does this by integrating available data and making it accessible - and by collecting any missing data. This is a key responsibility, as many different groups have a need for hard data relating to science: politicians, policymakers and academics, as well as the general public. De Jonge continues, "We have been requested by the Netherlands Ministry of Education, Culture and Sciences to expand our knowledge and



Jos de Jonge, theme coordinator for the Science in figures project

information infrastructure over the next few years. With scientific and academic research becoming an increasingly international endeavour, the Rathenau Instituut is expanding its scope of operation by also incorporating international studies in its research and by making international comparisons."

New website

In 2015 the general website of the Rathenau Instituut was revamped, while a special landing page was created with infographics on the state of Dutch arts and sciences. Says de Jonge, "We create factsheets which explain various issues very straightforwardly, stating all the facts. There's the term 'professor', for example. We mention professors all the time, but what is it that they really do? And how many are there in the Netherlands? The website contains an outline of the work of university professors, the male/female ratio in academia, and a brief description of the labour market for professors. (The current number of professors (university lecturers) in the Netherlands happens to be 4,419, by the way.) The underlying data relating to the factsheets are stored in separate data publications, which contain graphs and tables that are very easy to export to, say, an Excel spreadsheet."

Increased importance of the EU and regional areas

Dutch researchers are receiving a growing amount of funding from the European



There is a need across the board for hard data: politicians, policymakers and academics, as well as the public at large.

Commission, and the TWIN (Dutch acronym for Total Investments in Research and Innovation) data published by the Rathenau Instituut in 2015 revealed that the region is gaining importance as an investor in knowledge and innovation. The Total Investments in Science and Innovation is an annual report detailing government expenditure on research and innovation. The data showed that government funding declined during the period 2013-2019, which caused something of a stir in political circles and in various media outlets. In one headline, the Volkskrant newspaper reported that "The Netherlands spends significantly less on research than intended."

According to de Jonge, "The TWIN data showed that the government was cutting back on funding to public research organisations such as the Royal Netherlands Meteorological Institute (KNMI) and the National Institute for Public Health and the Environment (RIVM). The news sparked a debate, with both ends of the political spectrum using our data. Rathenau Instituut Director Melanie Peters, commenting on the issue in an interview, said that 'We need to lay the foundation for the discussion in the House of Representatives. It is our job to make sure everyone has access to the same data. We don't take any stances – we simply present the facts, describing the situation in the Netherlands compared to other countries and to what extent politicians have delivered on their promises. It is up to the political parties to determine whether the amounts provided in funding are adequate."

OECD

The Rathenau Instituut co-authored a report in 2015 for the Organisation for Economic Cooperation and Development (OECD) on the agri-food sector in the Netherlands. The report revealed that Dutch companies and research and educational institutions do not benefit enough from new tax measures and investments in key industries. According to de Jonge, "The OECD warned the Ministry of Economic Affairs after that report was released. The Netherlands is currently one of the leading countries in the world when it comes to this sector, in terms of both the knowhow available and economically. But if the Netherlands is to retain its leading position, it will need to develop long-term perspectives, so that the industry has a clear idea of what to expect from the future, and take the appropriate measures in anticipation." The Dutch government appears to have heeded this message. As de Jonge says, "Martijn van Dam, the State Secretary for Economic Affairs, endorsed the conclusions of the study. He, too, would like to see those long-term perspectives."

What's new?

In 2016 we will expand both the Dutch-language and the English-language versions of our landing page www.rathenau.nl/nl/wetenschap-in-cijfers, to give interested parties access to key data relating to scientific and academic research. What are the total investments in research, and how many academics and scientists are engaged in research on a daily basis? What significance does academic and scientific research have for society?

Science journalists and communications experts at a symposium hosted by the Rathenau Instituut in late summer 2015.

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ZAAL 1

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ST. 150

ZAAL 2

in the search

TEMPLE

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Theme 6: Improving policy through research

a unit

As part of the work programme theme 'Improving policy through research', the Rathenau Instituut explores relationships between citizens, science and policy. Many societal issues are highly complex, and research can help find solutions. Yet the use of academic research by policymakers has been known to create controversy at times. Recall, for example, the consternation caused by the climate reports published by the IPCC and the public unrest about fracking. The Rathenau Instituut critically examines the relationship between science, policy and the public.

'Public trust should not be taken for granted'

Is our climate changing? Is it safe to store radioactive waste underground? In situations rife with uncertainty and over which we have little control, the public needs to be able to have faith in science, public research organisations and policymakers.

"It's becoming more common for the government and political leaders to use scientific evidence to back up their assertions", says Theme coordinator Geert Munnichs. "Yet the use of academic research by policymakers has been known to create controversy at times. The public is quick to protest. One example would be the issue of fracking, a technology used for shale-gas production. In the projects grouped under the work programme theme 'Improving policy through research', we take a critical look at relationships between the public, the scientific community and policy. Does it help to enter into discussions with those who would oppose certain technologies? Should scientists be open about uncertainties or should they communicate a clear position? And just how reliable is scientific research if it is partly financed by the corporate sector? We create new links between scientific research, policy and society."



Geert Munnichs, theme coordinator Improving policy through research

High level of trust in science

A publication by the Rathenau Instituut titled 'Trust in science 2015' revealed that trust in science is consistently high among the Dutch public, and the news was retweeted many times. As it had three years before, the Instituut surveyed a total of 800 Dutch people to gauge their opinion on a number of institutions. Whereas public trust in the national government, parliament and major corporations fell sharply over three years, trust in science remained virtually level.

"The survey actually shows that this trust does come with some qualifications," says Geert Munnichs, "in the sense that trust in scientists diminishes if they are involved in government or the corporate sector. The Dutch public feels it is important that academics and scientists retain their independent position. What's interesting to me is that attendees at the conference devoted to the National Research Agenda, which we hosted in June 2015, advocated greater engagement in the academic and scientific communities. It appears that people want academics who, driven by the public interest, contribute to solving some of the social issues of our time, including privacy, climate change and sustainable energy."

Building blocks for involvement

A 2015 research report published by Rathenau Instituut on behalf of the Dutch Nuclear Safety and Radiation Protection Authority (Autoriteit Nucleaire Veiligheid en Stralingsbescherming) showed that members of the public would like to be involved in a discussion on managing radioactive waste, but they must be able to have the confidence that their input will be taken seriously in the decision-making process. The study also revealed that public involvement in the management of radioactive waste can only be successful if governments, NGOs and scientists get to participate in the debate as well.

Involving people through digital technology

Another 2015 study by the Rathenau Instituut, 'Opportunities and dilemmas of digital democracy', shows that the general public is dissatisfied with how political decisions are made in the Netherlands, and the majority of Dutch people demand more direct control over political and policymaking processes. Digital technology can play a part in this process. Several political parties cited this study in a debate in the Dutch Senate about the potential establishment of a State Committee for Reassessment of the Parliamentary System. In response to the study, researchers Ira van Keulen and Iris Korthagen authored an essay titled 'The public deserves more than a last-resort option.'

Public importance of science journalism

"Science journalists interpret, filter and explain scientific research to their audience. This is hugely important in a society like ours, in which science and technology play such a massive role. It may even be more important than many journalists themselves even realise." These were the opening words of the address by Gerdi Verbeet, Chair of the Board of the Rathenau Instituut, at an annual symposium hosted by the institute in late summer. The symposium theme for 2015 was the public importance of science journalism. The event attracted nearly 150 attendees, including a large number of science journalists and communication experts, policymakers, academic researchers and the MP for the centrist D66 party, Stientje van Velthoven. She also serves as a member of the Programme Board of the Rathenau Instituut, which has welcomed several new members in the past year.

Publications are being affected worldwide by a sharp decline in advertising revenues and smaller numbers of science editors. However, to quote Pulitzer Prize winner Dan Fagin, a professor of journalism at Columbia University and a keynote speaker at the event: "Never waste a good crisis." He explained, "There is a need for action in order to safeguard the quality of science journalism, and it should involve all parties concerned." Fagin is encouraged by the new digital revenue models which have emerged, in which editorial staff are not dependent on traditional advertising revenues. Examples include government-funded media such as the BBC and media supported by philanthropists, such as the US non-profit newsroom Propublica. Fagin believes that cooperation between scientists and journalists could help improve the quality of science journalism.

What's new?

In 2016, the Rathenau Instituut will draft a report on the question of how to involve the public in energy policy in a constructive way. The institute will also publish a study of public research organisations such as the various bureaus for policy analysis, the National Institute for Public Health and the Environment (RIVM), the Royal Netherlands Meteorological Instituut (KNMI), the Netherlands Organisation for Applied Scientific Research (TNO) and the Trimbos Institute. These publically funded organisations are managed by government ministries and serve the public interest by producing research to support policymaking. Through this project, the Rathenau Instituut aims to demonstrate the special role these research organisations play alongside the academic and scientific communities, policy, and society.

2015 in figures

Website



*Data up to 16th October 2015 Followed by transition to new website

**We trust science the most and big corporations the least. Want to know more? Read: Trust in science in the Netherlands 2015

Impact



Social media

✓ 4.915 Twitter followers (3,915 at year-end 2014) in 2397 LinkedIn followers (1,382 at year-end 2014) Facebook fans (407 at year-end 2014)

Financials



External funding

The basic funding of the Rathenau Instituut is provided by the Ministry of Education, Culture and Sciences. The institute has also established partnerships with clients such as the European Parliament, the European Commission and various other institutions. The previously imposed cut in funding, which amounted to 6% in 2015 and 2014's price cap, which will reach 10% from 2015 onward, were reflected in the 2015 financial data. The focus was on a structural increase in revenues from external funding combined with a structural reduction in costs. This cost reduction was implemented in the material project expenses and not in personnel costs. In order to protect its independent status, the Rathenau Instituut aims for a maximum of 25% funding from external clients. External projects are analysed to check that they satisfy the institute's objectives.



Personnel

Publications

Reports

Kansen en dilemma's van digitale democratie: wat kan digitale burgerbetrokkenheid betekenen voor het Nederlandse parlement? Edwards, A. & D. de Kool.

Werken aan de robotsamenleving: visies en inzichten uit de wetenschap over de relatie technologie en werkgelegenheid Est, R. van, I. van Keulen, L. Kool, A. van Waes & F. Brom.

Working on the robot society: visions and insights from science concerning the relationship between technology and employment Est, R. van, I. van Keulen, L. Kool, A. van Waes & F. Brom.

Just ordinary robots: automation from love to war Est, R. van & L. Royakkers.

Dicht op de huid: gezichts- en emotieherkenning in Nederland Janssen, A., L. Kool & J. Timmer.

Vertrouwen in de wetenschap 2015 *Jonge, J. de.*

Engaging scientists: organisation valorisation in the Netherlands Jong, S. de.

Working on the robot society: executive summary Kool, L. & R. van Est. **De datagedreven samenleving: achtergrondstudie** *Kool, L., J. Timmer & R. van Est.*

Sincere support: the rise of the e-coach Kool, L., J. Timmer & R. van Est (ed.).

Grondstoffenhonger duurzaam stillen Krom, A., A. van Waes, R. van Est & F. Brom.

Keuzes voor de toekomst van de Nederlandse wetenschap: analyse van beleidsopties bij vier scenario's

Meulen, B. van der, P. Maclaine Pont, P. Faasse, J. Deuten & R. Belder.

Total investment in research and innovation (TWIN) 2013-2019 Steen, J. van.

Totale Investeringen in Wetenschap en Innovatie 2013-2019 Steen, J. van.

Berekende risico's: verzekeren in een datagedreven samenleving Timmer, J., I. Elias, L. Kool & R. van Est.

Converging roads: linking self-driving cars to public goals Timmer, J., B. Pel, L. Kool, R. van Est & F. Brom. Publicatiedruk bij medischwetenschappelijk onderzoek: onderzoek naar beleving van publicatiedruk bij medisch onderzoekers bij UMC's Tijdink, J., P. Maclaine Pont & J. de Jonge.

Verslag van de conferentie 'Wetenschap en maatschappij in gesprek': Science for Society: adviezen voor de totstandkoming van de Nationale Wetenschapsagenda Vries, A. de, L. Hessels, H. Dorst, L. van Drooge, R. van Est & M. Peters.

Bouwstenen voor participatie: visie op publieksparticipatie bij de besluitvorming over beheer van radioactief afval

Vries, A. de, A. van Waes, R. van Est, B. van der Meulen & F. Brom.

Report/ Research Brief

A Research Brief is a summary of a report, containing a list of the main policy recommendations.

- Guarantee the quality of digital coaches
- Ready for the robot car
- Steeds meer R&D geld naar het buitenland

Longer articles

Valorisatie: onderzoekers doen al veel meer dan ze denken Drooge, L. van & S. de Jong.

Robotsamenleving: het gaat niet om de technologie, het gaat om ons Kool, L. & R. van Est.

Wetenschap, journalistiek en medialogica Korthagen, I.

Voor iedereen een universiteit Meulen, B. van der & P. Faasse.

Periodicals

Flux: client magazine published by the Rathenau Instituut

- No. 12 (January): Nederlandse universiteit: diplomafabriek of wereldverbeteraar?
- No. 13 (July): Overal robots: behouden wij onze menselijkheid?

VolTA: Magazine on science, technology and society

VoITA magazine was created by 15 European technology assessment institutes that were joined together in the European PACITA project. The initiative was designed to promote evidence-based policy relating to science, technology and

innovation.

- No. 07 (November 2014): Ageing
- No. 08 (April 2015; last issue): Sustainable consumption: every day a green day?

Publication details

This is the public report of the Rathenau Instituut, in which we outline our work in 2015. The Rathenau Instituut's full 2015 annual report is available on our website: www.rathenau.nl/jaarverslag2015

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