The Dutch Digitalisation Strategy 2021

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Photographer: Paul Teunissen

1. Introduction

Last year, the COVID-19 pandemic forced us to work, learn, shop and relax from home and online. The government, too, switched to working fully online within a short space of time: this way many policies could be developed and implemented, despite the coronavirus measures. We made a leap in scale with digitalisation in a wide range of sectors and domains. Fortunately, the Netherlands was well prepared and sections of our economy and society could keep running thanks in part to digital support. At the same time, the rapid scale-up made addressing issues of security, privacy and dependency more urgent.

Due to the coronavirus and because 2021 is an election year, this is a special edition of the Dutch Digitalisation Strategy (DDS).[1] The new government will commit itself to the digital transition with new energy. In addition, the House of Representatives aims to take on an even more active role in this process by setting up a Parliamentary Standing Committee on Digital Affairs.

However, they do not need to start from scratch. The DDS has achieved a great deal in recent years and has introduced a number of initiatives. For this reason, this update on the DDS also reflects on digitalisation in the Netherlands in a broader sense. Chapter 2 outlines the key results and developments that have brought us to where we are today. Chapter 3 provides an overview of the most important results since the last edition of the DDS.

This period during which the current government hands over its tasks to a new government provides us with an excellent opportunity to look back as well as towards the future. Technological, economic and social developments are moving fast and have an impact on the nature, pace and direction of the digital transition. The reverse is also true: the digital transition has an impact on social and economic developments. It is important for government and society to prepare for this impact at an early stage. After all, digitalisation is a long-term development with a major influence on everyone. The government has therefore commissioned a foresight study on the key trends and developments in the run-up to 2030. The aim is to provide insight into how these trends and developments relate to each other, so that future governments, businesses, knowledge institutions and citizens can discuss the key issues: what are we aiming to achieve through the digital transition? What steps do we need to take, now and in the future, to succeed in this together? A summary of the study can be found in Chapter 4. The full study is published as an appendix.

Finally, the usual appendices are also included: the DDS progress report and the financial overview for the digital economy.

[1] Since 2018, the DDS has brought together all central government policy on digitalisation, in close conjunction with the Dutch Cybersecurity Agenda and the Digital Government Agenda: NL DIGIbeter.

2. The Dutch Digitalisation Strategy 2018–2021: an overview

Digitalisation has gained momentum. Actions that have become commonplace, such as paying with your phone, connecting different smart devices and large-scale digital meetings, were still a pipe dream a few years ago. These developments are arriving in sectors and social domains at a fast pace. Examples include the large-scale roll-out of smart energy and gas meters, real-time mobility mapping and the use of AI applications in health care. As a result, digitalisation affects everyone.

In recent years, the Netherlands has consistently featured among the frontrunners in the European Digital Economy and Society Index (DESI). This is a performance we can be proud of. The DESI shows that the Netherlands scores high in all areas: we have a world-class network, our companies are innovative in their use of digitalisation, the public are taking advantage of digital opportunities and government authorities are increasingly using digital resources to improve their services, enforcement and supervision.

Such a leading position is only sustainable if everyone is able to contribute and benefit. This is also the basic principle of the Dutch Digitalisation Strategy: everyone takes part. This principle is all the more important now that it is becoming increasingly clear that digitalisation is essential to tackling key societal challenges, such as the transition to a sustainable energy and food supply, better care and education or good accessibility.

We are in the midst of the digital transition

The world is digitalising and the Netherlands is at the forefront. Rather than being a digital veneer on existing reality, digitalisation involves a genuine transformation of a wide range of activities and processes in our economy and society. There are few domains in which digital technology is not bringing about profound change. Digitalisation is changing production and services, communication and societal processes. In many cases, it makes things easier, faster, cheaper, easier or better, yet sometimes also more complicated or more problematic: companies need to reinvent their business models, markets are shaken up by new types of players, and globally active digital platforms that occupy a position of power can hinder companies' ability to compete. Artificial intelligence (AI) raises questions about machines that make decisions about us. Jobs change and require new skills. We are more vulnerable to espionage and sabotage, and system outages can cause disruption. We worry about freedom of expression, struggle with the issue of filter bubbles, and fear that democracy is being undermined. The comprehensive and interwoven nature of all aspects of the digital transition requires government to take on a strong role in areas such as digital security and cybersecurity, ethical issues surrounding AI and the use and optimisation of all the opportunities presented by digitalisation – including for the government's own tasks. Obviously, government also plays a role in legislation and regulation, such as the competition framework and privacy and data sharing

laws. The government's vision of digitalisation as a broad transition is closely aligned with that of the European Commission, whose programme for the coming years focuses on the *twin transition* of sustainability and digitalisation.

The digital transition is happening now, before our very eyes. During the pandemic, the digitalisation of crucial societal processes in areas such as health care, education and public administration is being fast-tracked. We are learning a lot from this process. Digitalisation is making a lot of things possible, but we are also discovering what digitalisation cannot do: video calls cannot compete with an evening with friends, working from home makes it harder to feel connected to colleagues, and a digital learning environment makes it more difficult for a teacher to get a sense of how a pupil is really doing. Digital tools cannot replace human contact. At best, they can help.

We are only now beginning to learn what digitalisation does to and for people, markets and the environment. Many capabilities are not being widely applied yet: here opportunities offer themselves. At the same time, risks, disadvantages and vulnerabilities are also becoming more visible, increasing the importance of digital resilience and strong frameworks.

Digitalisation is becoming ever more interwoven with all sectors and domains of the economy and society. Seventy per cent of IT professionals do not work in the IT sector, but apply their capabilities in areas such as health care, agriculture or logistics. The first thing that data used to bring to mind was spreadsheets. These days, it fuels an increasing number of processes.

Digitalisation is also playing a decisive role in developments in the labour market and requires continuous training and retraining. This also applies to more and more professions outside the ICT sector, which also require digital skills.

The digital transition will not just happen to us: it is a development that we can and must manage ourselves. To do this, we must set clear goals and make the right considerations, which, due to the ongoing process of digitalisation, may need to be revised in order to strike the right balance between all the interests at stake. Technology has shown us that many things are possible. The question facing society as a whole is: what do we want it to do? This question requires, and will continue to require, constant debate and reflection, in addition to an integrated strategic approach with clear ambitions and goals.

Cooperation and cohesion are essential

In 2018, with the Dutch Digitalisation Strategy (DDS) the government set out its first integrated approach to digitalisation for the purpose of managing the digital transition. The aim was and is to make responsible use of the opportunities presented by digitalisation. The strategy featured a two-pronged approach: scaling up the capabilities of digital applications within domains, and creating the foundations and preconditions for this to happen, such as security and privacy. In doing so, the government acknowledged the impact of digitalisation as a broad transition on all sectors and domains.

Under the leadership of their ministers, three ministries have joined forces to coordinate efforts in relation to the DDS. The Ministry of Economic Affairs and Climate Policy is responsible for the overarching digitalisation strategy and has systemic responsibility for the digital economy and the technical infrastructure. The Ministry of the Interior and Kingdom Relations is responsible for digital government, the civil service and digital inclusion on the basis of the Digital Government Agenda: NL Digibeter. The Ministry of Justice and Security is responsible for digital resilience in accordance with the Dutch Cybersecurity Agenda and for legal protection. The ministries are actively supported

by various administrative consultations in which all ministries take part, and they are advised by the Digital Netherlands Council.[2] As a result, digitalisation policy is now being developed in much closer cooperation. Collaboration with the business community, knowledge institutions and local authorities has been further strengthened through coalitions such as the AI Coalition, the Digital Society Alliance and the Data Sharing Coalition, but also through the Central/Regional Government Cooperation Agenda, in which digitalisation is an important theme.

What has been achieved in the last three years?

A great deal of progress has already been made in the use of digitalisation to strengthen our earning capacity and to tackle societal challenges. The pandemic has substantially accelerated a number of initiatives. An example is the Smart Industry approach, which started with a handful of field labs and grew into a nationwide network of 46 field labs and five regional hubs. Since the first 'Driven by Data' pilot in 's-Hertogenbosch, a national network of 16 SME workshops has emerged. At the end of 2019, the government launched its Strategic Action Plan for AI (SAPAI). The associated AI Coalition has since grown to more than 400 members, the government has made extra funding available, and we are working at national, European and global levels to strengthen the Dutch AI ecosystem. The government recognises that a flourishing data economy is essential in order to achieve this. Based on the data sharing vision[3], the government is facilitating voluntary data sharing between sectors through the Data Sharing Coalition in order to utilise data capabilities for the benefit of the economy and society in a responsible way. Digital government is another area that has continued to evolve. The government itself is no longer centre stage, but rather the societal issues to which it needs to find solutions, or the life events in which it plays a role.

In both the Netherlands and Europe, much work has been done to further strengthen the foundations for digitalisation, to ensure that basic rights and public values are also safeguarded in the digital domain and that the appropriate legislation and supervision are in place. Issues such as those surrounding the childcare allowance affair and the SyRi case have further accentuated the urgent need for such measures.

[2] The Digital Netherlands Forum (*Beraad Nederland Digitaal*) joins the ministers in the deliberation process on digitalisation policy and consists of leading experts in the preconditions and domains described in the DDS.

[3] https://www.rijksoverheid.nl/documenten/publicaties/2019/02/20/nederland-digitaal---de-nederlandse-visie-op-datadeling-tussen-bedrijven

A major milestone was the entry into force of the General Data Protection Regulation (GDPR) in 2018. The GDPR modernised the frameworks for the use of personal data and the privacy of citizens. In the area of digital economic platforms, the Netherlands has successfully argued in Europe for additional rules to govern platforms with a gatekeeper function. The proposal for the Digital Market Act was presented last December, in line with the Dutch policy commitment. This legislation will grant regulators the power to impose ex-ante obligations on such platforms.

The volume of data in the EU is expected to grow by 530% from 2018 to 2025.[4] This also raises the issue of infrastructure: how do we ensure that this data will safely reach the right place at the right time? The Netherlands' digital networks are world-class and have held up well through the peaks of the coronavirus pandemic. A coronavirus stress test by the World Economic Forum[5] placed the Dutch digital infrastructure in the global top three. The efforts of citizens' initiatives and market players in recent years have succeeded in providing internet connections in more remote areas earlier than expected. Almost 99% of Dutch households now have access to internet with download speeds of at least 100 Mbps, and in large parts of the Netherlands 5G is available via the networks of the three mobile providers.

On the other hand, digital connectivity makes us more vulnerable to those with malicious intent. The threat from state actors and cybercriminals and the risk of digital service, process or system outages have gradually become permanent. To limit these risks, the government has invested €95 million on a structural basis in enhancing digital resilience and has developed the Dutch Cyber Security Agenda (NCSA) for this purpose.

Digitalisation that works for us

All in all in recent years a great deal has been achieved and set in motion. At the same time, many opportunities remain unexploited. Examples include the potential role of digitalisation in achieving a sustainable food supply, in the use of renewable energy sources and in the climate transition. The European Commission goes so far as to view the sustainable and digital transition as a 'twin transition': two processes that go hand in hand. As a result, digitalisation is an important instrument in the European Green Deal.

Partly as a result of the coronavirus pandemic, it has become increasingly clear how dependent the Netherlands and Europe are on digital technology and services developed elsewhere. This raises questions about the digital sovereignty of the Netherlands and Europe[6]. The key issue is that the Netherlands and Europe must be able to act autonomously to safeguard their public interests in the digital domain. This is not self-evident, now that European standards, values and competitiveness in the digital domain are increasingly under pressure from geopolitical developments and international power shifts. The reasons for this include tech conglomerates dominating digital markets or censoring messaging, countries abusing critical processes in the Netherlands for the purpose of espionage, and an unwanted dependency on foreign technologies, knowledge and applications.

For the government, digital sovereignty is not a goal in itself: the guiding principle must be an open and resilient Netherlands and EU. Digital sovereignty is an important means to this end. The Netherlands and the EU need to work together to boost their competitiveness in a globalised world. Europe wants to make deliberate investments to

[4] Europese Commissie, European Data Strategy, 2019.

[5] https://www.uva.nl/content/nieuws/persberichten/2020/12/nederland-en-scandinavische-landen-het-beste-in-staat-om-uit-coronacrisis-te-komen.html

[6] We use the term 'digital sovereignty' here because it is the standard European jargon. 'Digital autonomy' would be more accurate, however, since we are referring to the digital dimension of strategic autonomy.

develop its own competencies in digital technology and data, while the Netherlands is seeking to collaborate with like-minded countries both in Europe and further afield.

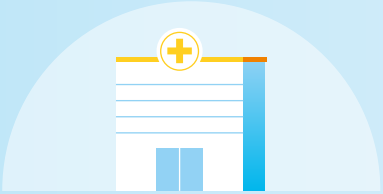
The new European budget for the period 2021–2027 includes investments earmarked for digitalisation. An important pillar of this policy is the Digital Europe Programme, with €7.5 billion set aside for innovation in areas such as AI, data, cybersecurity and quantum technology. Digitalisation will also play a key role in the recovery process in the wake of the coronavirus pandemic. It is therefore a key priority for the European Recovery Fund, of which at least 20%, or €134.5 billion, has been allocated to digitalisation projects.

Through the Growth Fund, the Netherlands will also be investing heavily in the digital transition at national level in the coming years. At the time this DDS update went to press, it was announced that the Growth Fund committee had awarded funding in the first round to projects including AiNed (artificial intelligence), QuantumDeltaNL (quantum technology for secure networks and communication), two education projects (digital applications for lessons and school recommendations), Health-RI (data networks between hospitals) and RegMed XB (new medicine based on gene and cell therapy).[7]

Digitalisation plays an essential role in tackling social challenges:

Agriculture

Towards a safe and sustainable food supply. Digitalisation makes a significant contribution towards sustainable and economically viable agriculture, robust nature and a sustainable food supply.



Healthcare

For good, accessible, reliable and affordable health care. Digitalisation supports the development of new and better health care, to ensure that appropriate care is provided in the appropriate setting and to encourage appropriate use. The effective and timely exchange of information with patients and between health care providers is important for good-quality health care.

Education

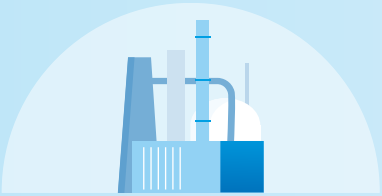
Digitalisation offers opportunities for high-quality education that is accessible to all. Adaptive learning tools and digital identities can contribute to personalised learning, educational flexibility and distance learning; and to reducing teacher workload.

Digitalisation requires digital skills and literacy for all. Developing digital skills should be accessible and achievable for everyone to ensure that everyone is able to participate.

[7] https://www.rijksoverheid.nl/documenten/kamerstukken/2021/04/09/kamerbrief-bekostiging-investeringsvoorstellen-uit-nationaal-groeifonds

Research

Better and faster results can be achieved through reusable, sharable and machine readable research data, faster and more powerful (super)computers and up to date data services, such as connections and storage.



Industry

Innovation through digitalisation enables industry to continue to contribute to growing prosperity and reducing the consumption of raw materials and energy, despite the fact that labour productivity is under pressure due to a shrinking workforce and the limited availability of well-trained staff.

SMEs

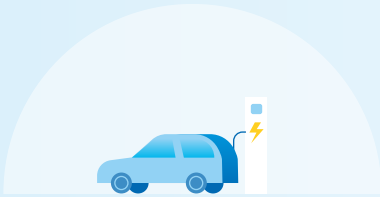
The broad SME sector is struggling to keep up with economic changes and to cope with growing competition. Digitalisation reinforces this effect. It is therefore important that SMEs are encouraged to invest in digitalisation, so that they can continue to offer their products and services.

Energy

In the transition to a sustainable energy supply, digitalisation is essential for the development of flexible energy networks, for the efficient use of the energy system, and to limit the costs of this transition.

Government

The government is always responsible for good governance, including in emergency situations, and an effective provision of information to the public. Digitalisation plays an increasingly important role in this context, but consideration must be given to continuity, accessibility and basic rights.



Mobility

Goede bereikbaarheid, doorstroming, duurzaamheid en verkeersveiligheid kunnen worden gerealiseerd met een integraal en multimodaal mobiliteitssysteem waarin de verplaatsing centraal staan. Kwaliteit en beschikbaarheid van data spelen daarbij een grote rol.

Dutch Digitalisation Strategy 2018-2021

Reaching for the top

Top 4 best digital infrastructure in Europe
according to DESI 2020

5th in terms of innovation
according to GII 2020

7th in the EU digital government ranking
according to DESI 2020

Working to improve the governance of the digital transition

Coordinating ministries:

Economic Affairs & Climate Policy

Interior & Kingdom Relations

Justice and Security

In cooperation with all ministries

Advised by scientists, education experts, civil-society organisations and businesses through the Digital Netherlands Council

Increasing contribution to tackling societal challenges

A safe and sustainable food supply

Good accessibility

Better care

Suitable education

Clean energy

Ever closer cooperation

NL AI Coalitie
Netherlands AI Coalition
>400 members

Data Sharing Coalition
38 members

digital trust center.
Digital Trust Center
33 members

Alliantie Digitaal Samenleven
Digital Society Alliance
>40 members

Dutch Blockchain Coalition
Dutch Blockchain Coalition
43 members

Increased importance of digitalisation to the economy

36% of economic growth

is due to investments in ICT

€21 billion software

€9 billion hardware

ICT investments in the Netherlands
21% of total investments

520,000 more jobs in ICT
as a result of digitalisation

3. Dutch Digitalisation Strategy 2021

Since the last update of the DDS in June 2020, many parties throughout the Netherlands have once again made significant progress. In this chapter, we highlight the key results in relation to six priority areas: artificial intelligence, data use and sharing, inclusion, connectivity, resilience and government. In the final subchapter, we reveal how the Netherlands is collaborating at both the national and international levels to establish a responsible digital economy and society.

3.1 Artificial intelligence

Artificial intelligence (AI) is booming and has already become an integral part of our society. AI applications help to reduce energy costs, improve the efficiency and sustainability of food production, and predict COVID outbreaks. Social acceptance and economic success are only possible if AI applications serve the people and if public values (such as privacy and autonomy) and human rights are fostered and respected at all stages of the AI life cycle (from design to application). AI does not exist within a normative vacuum. An extensive legal framework is already in place, such as the various human rights treaties within the framework of the Council of Europe, European rules on privacy and equal treatment, and national legislation such as the General Administrative Law Act (Awb). Adopting a learning approach means that developments can be monitored and the existing frameworks can be revised if necessary.

Government policy is based on the Strategic Action Plan for AI (SAPAI).[8] At both the European and international levels, the Netherlands presents itself as a leader in AI applications that serve people and society. The Netherlands is committed to European and international cooperation within appropriate ethical and legal frameworks.

The AI public-private partnership: research and innovation

The public-private partnership is an important key to success. This success is evident, among other things, from the growth of the Dutch AI Coalition (NLAIC), which now has more than 400 members from the business, science, government and education sectors. They are active in 17 working groups, in areas that include energy and sustainability, health and care, education, agriculture and food, and security, peace and justice. There are 16 public-private research labs at universities. In 2020, the AI Coalition collaborated with civil-society organisations within the 'Ethical Legal and Societal Aspects' (ELSA) labs approach, using large-scale databases and smart algorithms to find solutions to socially relevant problems, such as the prevention of poverty and debt. The ultimate goal is to create practical ethical frameworks and guidelines for AI developments and applications. In 2020, the AI Coalition also developed the AiNed programme: an ambitious and comprehensive agenda for the period 2020–2027 to position the Netherlands internationally as the best testing ground for the introduction of responsible AI applications.

In order to implement SAPAI, the government also invested in AI in 2020. On top of the €45 million annual basic funding provided by central government for AI research and innovation, the Ministries of Education, Culture and Science, Economic Affairs and Climate Policy, Justice and Security and Defence co-finance the AI Synergy Theme as part

8 https://www.rijksoverheid.nl/ministeries/ministerie-van-economische-zaken-en-klimaat/documenten/beleidsnotas/2019/10/08/strategisch-actieplan-voor-artificiele-intelligentie. The policy letters on 'AI, public values and human rights' and 'Safeguards for the risks of data analyses conducted by the government' were presented to the House of Representatives at the same time as SAPAI.

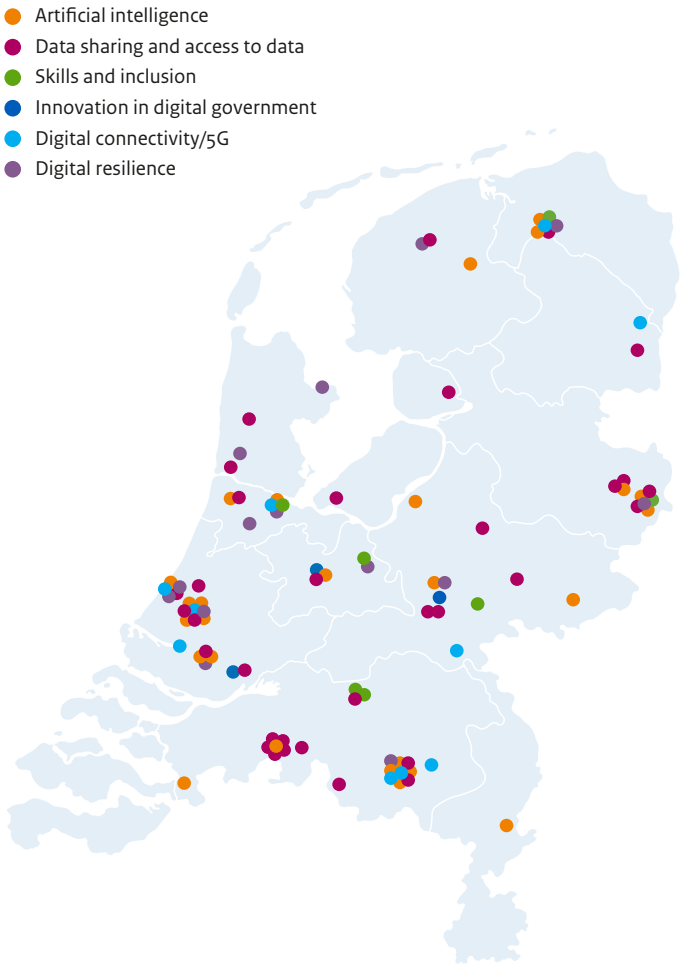
of the National Science Agenda (NWA). This new interdisciplinary research programme is currently being finalised. Support is also provided for socially relevant initiatives such as public use cases in various domains, the National AI Police Lab, Civic Lab, and Small Business Innovation Research (SBIR) pilot projects involving AI in the public sector.[9]

Dutch consortia know how to make the best use of the European funding frameworks for AI, partly due to active information campaigns by the Dutch government. In the recent EC ICT-48 call, Dutch participants secured €5.9 million of the €50 million in available funding.

Safeguarding public values and human rights

The opportunities and risks presented by AI and algorithms are a topic of discussion within society, in the media and in political circles. Risk management is a particular focus of debate. Concerns are being raised about the protection of public values and human rights, such as privacy, non-discrimination, autonomy and human dignity. Prompted in part by the motions put forward by Van den Berg/Wörsdörfer[10], and Buitenweg[11] and the Netherlands Scientific Council for Government Policy (WRR) report *Weten is nog geen doen* (Why knowing what to do is not enough)[12], last year the government commissioned three studies on the following issues: the legal aspects of decision-making algorithms, the unforeseen effects of self-learning algorithms, and the modernisation of Dutch procedural law in light of big data.[13] The first study argues that the existing legal frameworks are broadly robust in terms of protecting the public values of non-discrimination, data protection and legal protection. At the same time, the study identifies concerns such as how the concept of 'automated decision-making' in the GDPR should be interpreted in relation to the use of algorithms. The government notes that further clarity is required in legal practice as to how the law should be interpreted and whether sector-specific interventions are necessary. The government is also considering whether more legal safeguards are needed. The study on unforeseen effects shows that the opportunities and risks presented by algorithms in terms of

Testing grounds in the Netherlands



[9] Through the SBIR programme, the government challenges entrepreneurs to develop innovative products and services to tackle social issues.

[10] Motion put forward by Van den Berg/Wörsdörfer on an investigation into the undesirable effects of algorithms, 21501-33, no. 748: https://www.tweedekamer.nl/kamerstukken/detail?id=2019Z03423&did=2019D07342

[11] Parliamentary Papers II, 2017/18, 32 761, no. 119

[12] Parliamentary Papers II, 2017/18, 34 775 VI, no. 88, p. 9.

[13] See the letter to the House of Representatives on this subject: https://www.rijksoverheid.nl/documenten/kamerstukken/2020/11/20/tk-kabinetsreactie-op-drietal-onderzoeken-naar-algoritmen

"With the support of organisations such as Techleap, the government's innovation agenda will contribute to creating a climate in which the Netherlands is willing and able to take the lead when it comes to technology. As a start-up we didn't apply for financial or other support, but we're well aware that innovative businesses have a larger ecosystem. Among other things, this will help them recruit and retain new talent."

SMRTR Consulting

public interests and values depend mainly on the application, the sector and the organisational context, and less on the algorithm itself.

In October 2020, the government announced that it would set up an official project group to draw up a research and policy agenda for the standardisation and supervision of algorithms.[14] This stems from the government's response to the Middendorp initiative policy document *Menselijke grip op algoritmen* (Human grip on algorithms).[15]

In December 2020, acting on the government's instructions, Tilburg University delivered a Guide to System Principles for Non-Discrimination and Undesirable Bias in Algorithmic Systems. The House of Representatives will receive more information on this document shortly. The plan is to apply these system principles in 2021, including in the previously mentioned ELSA labs.

Utrecht University is developing an impact assessment for human rights and algorithms (IAMA), which will help to mitigate risks in relation to discrimination and other rights violations. The assessment is expected to be finalised in April. A WRR recommendation on AI and public values, focusing on potential government action, is likely to be ready by the end of 2021.

The government has set up an 'AI, public values and human rights' knowledge platform where ministries exchange knowledge and develop policy on public values and human rights in AI applications. This knowledge platform manages a knowledge base (www.kennisaipubliekewaarden.nl) and publishes a monthly newsletter.

In order to stimulate awareness and dialogue on AI innovation among administrators, policymakers, developers and the public, the government has organised civil dialogue and commissioned teaching materials. One example of such teaching materials is the game TechTwijfels (Tech Misgivings), which encourages students to discuss the opportunities and risks presented by technology.

The government also supports specific AI projects that help to safeguard and strengthen public values and human rights. For example, the Ministry of Education, Culture and Science collaborated with the Ministry of the Interior and Kingdom Relations and the Social Affairs and Employment Inspectorate to organise a hackathon, which challenged experts to come up with creative solutions to tackle discrimination in automated recruitment and selection systems. The Ministry of the Interior and Kingdom Relations invested funds from the Innovation Budget in 'AI with impact', a method to increase human control of AI, and in its January 2021 Start-up in Residence programme the Ministry challenged parties to develop methods to detect bias in AI systems. The Ministry will also launch a new round of the SBIR programme this year for human-centric applications that use new technologies such as AI and will award the Human-centric AI Award to an AI application that safeguards and strengthens human rights.

Geronimo AI

Through the Start-up in Residence programme, the start-up Geronimo AI has helped the Central Government Real Estate Agency to provide insight into 45,000 hectares of leasehold land. AI is used to connect and analyse satellite images and data on crop growth curves, making it possible to see what is growing and thriving in each 10m2. This technology enables the Central Government Real Estate Agency to enforce and issue building plans and to safeguard the soil quality and food supply for the Netherlands of the future.

[14] Parliamentary Papers II, 2019/20, 35 212, no. 5

[15] Parliamentary Papers II, 2019/20, 35 212, no. 3

International engagement

Along with like-minded countries, the Netherlands is actively contributing to the discussion on the legislative framework for AI. On 21 April, the European Commission launched proposals for the further regulation of high-risk AI applications. By te end of this year the Council of Europe will conclude a feasibility study on a legal framework for AI from the perspective of human rights and the democratic rule of law.

The Netherlands takes part in the *Global Partnership on Artificial Intelligence* (GPAI): a leading international and multi-stakeholder partnership with like-minded countries. The GPAI is working on projects for responsible AI that respect human and basic rights. In addition, the Netherlands is actively involved in negotiations on ethical recommendations for AI within UNESCO.

In the past year, the government has also increased the bilateral knowledge exchange with countries including the United States and Singapore, and is working bilaterally and at the European level with priority countries such as Belgium, Germany and France, organising innovation missions for this purpose. The start of 2021 saw the signing of the Dutch-German innovation pact and the launch of the international 'virtual' field lab AI4DT, where AI can be tested in combination with 'digital twinning' to enable its application by SMEs.

AI applications in clinical practice and data availability for AI

The Ministry of Health, Welfare and Sport commissioned two measurements to gain insight into the use of AI applications in health care practice and the availability of data for the development, training, validation and application of AI. These baseline measurements will be used to measure the progress achieved over the coming years in the field of AI for health and care in the Netherlands.

The first baseline measurement (KPMG) led to the identification of 111 AI applications that are being used or tested in clinical practice. The majority are currently used for diagnostics in curative care, with a focus on improving quality and efficiency. A key conclusion was that cooperation with the patient and other parties increases the success of the AI application in practice.

The second baseline measurement on data availability for AI (Cap Gemini) resulted in the identification of 23 data collection initiatives, with a focus on science, quality and reporting in curative care. Cap Gemini identified several perspectives for action in relation to the use of this data for AI.

3.2 Data

Data is the foundation of the digital economy and society. The volume of data, its potential applications and therefore its value are growing exponentially. Data is the fuel for AI and digital innovation is inconceivable without data. Research can be improved by reusable, shareable and machine-readable research data, faster and more powerful computers and supercomputers, and up-to-date data services such as connections and storage.

However, data must be used carefully, not only when it comes to personal data, and certainly when it is done on a large scale. Areas of concern include violations of privacy or autonomy, data monopolies and lack of access to data by parties such as SMEs. The government's aim is for everyone to have clear and effective insight into what happens to their data and to be able to stay in control of it. Business and industry in the Netherlands and Europe play a key role in this process, together with knowledge institutions and government.

Value of data

There is much speculation about the enormous economic impact data can have and the value it represents. Statistics Netherlands (CBS) has made an initial estimate of the value of data to the Dutch economy.[16] Data investments made by Dutch companies grew substantially year on year between 2001 and 2017, reaching €20 billion in 2017.

Access to data

The launch of the Data Sharing Coalition marked an important step towards responsible data sharing between companies and institutions. Last year, the coalition grew to 38 members. As part of the coalition, existing data-sharing initiatives, industry associations, knowledge institutions, companies, scientists and experts are working to create a generic system of agreements to share data across sectors. As it is not confined to the borders of the Netherlands, this initiative has an international dimension and is open to members from all countries.

Based on the results of an exploratory study[17] on the role, risks and opportunities of data in the tech sector, the government is exploring the options for improving access to and control over data.

Green loans

With the increasing use of smart meters, the amount of available data on energy consumption has grown substantially in recent years. Today, this data is mainly used to balance the energy network and for billing purposes. With new applications, however this data can also make a significant contribution to sustainability.

The Data Sharing Coalition is currently developing a use case where consumers can use their energy data to gain insight into the potential for energy-saving measures in their specific household. Support could range from sustainability advice to a tax-efficient 'green loan' to spend on investments in energy-saving measures, such as heat pumps or solar panels.

European developments

Data traffic is not constrained by borders. The government therefore views the European Union as the primary action level to establish frameworks for data use and infrastructure services. The European data strategy published in February 2020 addresses a number of obstacles to a well-func-

[16] https://www.cbs.nl/nl-nl/longread/aanvullende-statistische-diensten/2020/de-waarde-van-data-2001-2017

[17] https://www.rijksoverheid.nl/onderwerpen/ondernemen-en-innovatie/documenten/kamerstukken/2021/03/18/aanbieding-verkenning-verplichtingen-datadeling-technologiesector

tioning data economy.[18] Security, privacy and control over data are key factors. This approach is in line with the Dutch vision on data sharing between companies and the FAIR principles, which state that data must be Findable, Accessible, Interoperable and Reusable.

In November 2020, the European Commission published the Data Governance Act. This legislation aims to improve the availability of data in the EU by increasing public data sharing, by bolstering trust in data intermediaries, and by strengthening data sharing mechanisms in the EU. The Netherlands is cautiously positive, while recognising that this proposal fails to address a number of issues such as access to data.[19] The announced Data Act may provide further frameworks in these areas.

In addition to the right conditions for the use and exchange of data, there is also a need for secure and reliable data storage and processing facilities. For example, there are concerns regarding the limited European cloud services supply and dependence on non-European parties.

Partly for this reason, there is a growing willingness to invest in joint initiatives for data processing and storage. Together with various funds of the Multiannual Financial Framework (MFF) and with Member States, the European Commission intends to invest €4-10 billion in European cloud infrastructures, standardisation and data quality to improve the secure and easy exchange and storage of data and to create greater freedom of choice. In October 2020, the Netherlands signed a declaration on this subject together with all EU Member States.[20]

The government is also facilitating a number of Dutch companies that want to join the GAIA-X programme and is making efforts to safeguard Dutch interests associated with the initiative. GAIA-X is a public-private initiative, originally between Germany and France, that aims to connect European cloud and data services and make them more accessible as an alternative to the current major non-European players. The Netherlands Organisation for Applied Scientific Research (TNO) is working on the first Dutch GAIA-X hub, in which use cases will be developed. Participation in such European initiatives provides additional opportunities for Dutch businesses and can offer Dutch government authorities opportunities to increase their digital autonomy.

For the scientific domain at the end of 2020 the European Open Science Cloud (EOSC) Association was set up. All legal and technological foundations are in place for the implementation of this data space through a Horizon Europe partnership. In November 2020, agreements were reached at a GO FAIR/CODATA symposium on data sharing for scientific research between regional clouds in Europe, Africa, the US, China and Australia. These agreements form the basis for a Web of FAIR Data & Services. The agreements on the FAIR Digital Object[21] were confirmed on 1 December.

Protection of personal data

The GDPR gives citizens more rights in relation to their personal data. The European Commission carried out its first evaluation of the GDPR in 2020. In its own conclusions, the Netherlands paid specific attention to the burden the GDPR imposes on SMEs and the effect of the GDPR on new technology. The European Commission does not anticipate any changes to the regulation for the time being, but it is leaving the door open to a number of targeted amendments. The government is working on an amendment to the General Data Protection Regulation (Implementation) Act (UAVG) to provide greater

[18] https://www.rijksoverheid.nl/documenten/rapporten/2020/04/14/mededeling-over-een-europese-datastrategie

[19] See BNC file, Parliamentary Paper 22 112, no. 3016.

[20] https://ec.europa.eu/digital-single-market/en/news/towards-next-generation-cloud-europe

[21] A FAIR Digital Object (FDO) brings all essential information about an entity together in one place and creates a new kind of usable, meaningful and technology-independent digital object: the technical essence of a thing in cyberspace.

Precision Agriculture PPS 4.0

Over the past year, a consortium from the agricultural sector led by Wageningen University & Research (WUR) has worked on a feasibility study for the creation of data-sharing infrastructure in open cultivation. The data position of the farmer and grower is key to designing an architecture in which data is shared in a safe and responsible manner. The aim is to give agricultural entrepreneurs as much control as possible over data generated by their business activities. In the next phase, several parties will work on developing a number of use cases that require the controlled sharing of data from farmers. A report of the findings can be found at https://edepot.wur.nl/532701

clarity on the conditions for the use of biometrics for personal identification.

In its vision on horizontal privacy, the government shared its agenda for increasing privacy awareness, increasing the perspective for action, and reinforcing standards.[22]

[22] The House of Representatives received an update on this agenda in February 2021: Letter to the House of Representatives on the status regarding the implementation of the Horizontal Privacy Agenda | Parliamentary Paper | Rijksoverheid.nl

Partly in response to the study 'Provision for requests for the rapid removal of unlawful online content[23], the government wants to ensure that interested parties can have unlawful content (such as material that breaches privacy) removed faster. To this end, the existing notice and takedown procedures will be developed further and agreements will be signed with implementing organisations and regulators.

New technological developments are leading to more privacy violations. Devices that allow the covert collection of personal data (images or conversations) are becoming ever cheaper and more readily available. This situation prompted the government to designate violations of privacy that cause a great deal of distress and suffering not only as reprehensible, but also as punishable in the Reassessment of Criminalisation (Current Forms of Crime) Act (Act of 27 September 2019, Bulletin of Acts and Decrees 2019, 311). The Act includes a tightening of the standards relating to revenge porn, making the abuse of sexual images punishable as a separate offence.[24] Products such as drones do not have an illegal purpose in themselves and do not always violate the legal order or the legitimate interests of third parties. One of the options the government has therefore chosen in this instance is to raise awareness among drone users. For example, greater sums will be invested in training and a manual will be published covering aspects such as the privacy risks associated with drone flights.

[23] https://www.rijksoverheid.nl/documenten/rapporten/2020/11/30/tk-bijlage-aanbieding-wodc-onderzoek-voorziening-voor-verzoeken-tot-snelle-verwijdering-van-onrechtmatige-online-content

[24] Section 139h of the Dutch Criminal Code.

Data Management Programme

In 2020, an interdepartmental Data Management Steering Group was set up. Under the supervision of this steering group, a legal task force was formed that is developing proposals for further statutory regulation of data sharing by government registries with third-party private service providers. These proposals will ultimately be implemented in the Digital Government Act.

Digitalisation and data for sustainability

The European Commission views digitalisation and sustainability as 'twin transitions' and has put them at the heart of its new agenda. This has led to an increasing focus on the areas of overlap between the two domains. The collection and use of data can contribute significantly to addressing the sustainability challenge that also faces the Netherlands: we need to drastically reduce our emissions and our consumption of raw materials. In December 2020, the European Environment Council adopted Council conclusions on the best use of digital tools in addressing

sustainability issues. On Digital Day, 19 March 2021, EU Member States signed a declaration on the importance of a green digital transition. In addition, the corporate sector has established the European Green Digital Coalition to develop and promote green digital solutions.

There are also opportunities at the national level. For example, the platform Anders Reizen (Transforming Travel) has reached agreements with all partners to continue to encourage working from home after the pandemic. Thanks in part to digitalisation, the issue of traffic congestion was largely resolved while substantial parts of the economy continued to operate. However, the synergies between digitalisation and sustainability do not stop there. The Climate Agreement recognises the important role of further digitalisation of the energy system in replacing existing fossil sources with often unpredictable renewable sources, such as wind and solar, for a carbon-free electricity system.

For some time now, efforts have been made in collaboration with and by the ICT sector to reduce the sector's own environmental impact. In the Netherlands, the public-private LEAP coalition is working to bring about a significant reduction in the energy consumption of data centres. The first step is to achieve average energy savings of 10% by adjusting the server settings.[25] Since 2020, the residual heat from data centres has come under the SDE++ scheme, which aims to promote CO2 reduction techniques.

The Raw Materials Agreement features incentives to work in a data-driven way in the pursuit of a circular economy, in which raw materials are used and reused in the most efficient possible way. A truly circular market requires cooperation and information sharing within and between chains. A report commissioned by the Ministry of Infrastructure and Water Management suggests that this can act as a catalyst for scaling up successful initiatives for the 'circularisation' of consumer goods.[26]

Data for the domains of agriculture and nature

Digitalisation also plays a crucial role in viable, sustainable agriculture and fisheries and in strengthening biodiversity and nature. Farmers and growers are able to monitor and control their nitrogen emissions using precision fertilisation based on validated sensors, while the national and international exchange of data and eRecognition provide farmers with greater insight into their manure flows. The use of blockchain can help to increase transparency for producers and consumers regarding production methods and price-setting within the chain[27]. Dutch innovations such as these are helping to safeguard and improve food security worldwide. Moreover, data collection and analysis are resulting in a better understanding of the natural and environmental effects of production conditions (such as temperature, precipitation, and barn configuration) and production resources (such as water, soil, plant protection products, and animal feed). This can improve product quality and reduce emissions through more targeted and efficient use of production resources. Pilot projects on precision agriculture show that average savings of 20% (within a range of 10–70%) can be achieved in the use of plant protection products, manure and water.[28]

Data for energy

Thanks to the large-scale roll-out of smart meters, measurement and consumption data is much more detailed and more rapidly available. As a result, new applications are possible and supply and demand can be coordinated better. End users can be informed faster and in greater detail about

[25] https://amsterdameconomicboard.com/nieuws/spaarstand-maakt-dataservers-10-procent-zuiniger

[26] https://duurzaamheid.nl/artikelen/data-benutten-voor-circulaire-consumptiegoederen/

[27] See the report Blockchain voor agrifood: tussen droom en daad (Blockchain for agrifood: between dream and deed), which is available for download at https://doi.org/10.18174/535127

[28] See www.proeftuinprecisielandbouw.nl

their consumption and costs, and the financial settlement process can be refined. In addition, the combination of digitalisation and sustainability offers end users a greater degree of 'self-determination' within the electricity system. In mid-2021, the proposal for a new Energy Act based on the European Electricity Directive will be sent to the House of Representatives. It will improve cooperation in the measurement chain, increase the availability of high-quality and high-frequency data, and improve access to and the exchange of data.

Smart, sustainable mobility

In recent years, the government has been working towards an integrated mobility system centred around the user or passenger. Since data plays a major role in this transition, steps have been taken to improve and facilitate the exchange of data.

Last year, the European Data for Road Safety pilot project was successfully completed and scaled up to a permanent exchange.[29] Under the chairmanship of the Netherlands, a data ecosystem has been set up with Member States and industry parties in which anonymous sensor data from hundreds of thousands of vehicles is shared with governments and road authorities in order to detect unsafe road situations and share information about these with road users.

[29] For further information, visit www.dataforroadsafety.eu

FAIR-projects

The Ministry of Infrastructure and Water Management will complete two FAIR data pilots in early 2021. As part of the 'Working together in the subsoil' pilot project, a network operator, municipality, water board and drinking water company have agreed to share asset data and work planning data with each other, whereby the data remains in the original GIS database and is made FAIR at that location. This enables the participating parties jointly to tackle work in the subsoil, saving on costs and reducing inconvenience to local residents. The pilot project will be completed in early April 2021 and then rolled out nationwide to interested organisations. The 'Drought & Flooding' pilot project aims to make FAIR the water quantity data generated by water boards and the Directorate-General for Public Works and Water Management. Following completion, a national information dashboard will be developed for which all data must be made FAIR at the source. This national overview will enable better water management in periods of drought and extreme rainfall.

"The Climate Agreement clearly states that digitalisation is an essential precondition for the energy transition. We're currently exploring the data-driven evaluation of the energy performance of buildings. What's more, digitalisation has also been mentioned in a number of policy documents as an enabler that will allow us to make maintenance, renovation and construction of buildings and infrastructure sustainable."

Huub Keizers, BTIC

In order for increasingly automated and digitised vehicles (self-driving or otherwise) to operate smoothly and safely, good availability of data on the physical infrastructure is essential. That is why the National Mobility Data Access Point (NTM) is being launched, where data on road traffic and multimodal travel information come together and are made accessible to all parties.[30]

The logistics and transport sector is witnessing a shift towards 'digital by default', which involves the replacement of all paper with digital data shared via the Basic Data Infrastructure (BDI)[31]. From 2025, this will allow decentralised data sharing between companies and authorities for all forms of transport. Over the next three years, the platform will be developed in phases in close cooperation with the sector. The Ministry of Infrastructure and Water Management, Customs, the main ports and their Port Community Systems are taking the first steps. One of the components of the BDI that has been completed in the past year is DEFLog: the Data Exchange Facility for logistics. DEFLog enables logistics service providers to digitally incorporate road closures, roadworks and other infrastructure 'disruptions' into their planning. Vice versa, road authorities no longer need to consult major logistics service providers when organising their traffic management. In collaboration with the Logistics top sector, work has also been done in recent years on the development of other BDI building blocks, such as standards for data sharing (Open Trip Model) and rules for the identification, authentication and authorisation of BDI users (iSHARE).

[30] *Smart mobility in beweging* (Smart mobility on the move) (Parliamentary Papers II, 2020/21, 31 305, no. 322).

[31] Implementation status of the Digital Transport Strategy for Goods Transport and the Basic Data Infrastructure (Parliamentary Papers II, 2020/21, 26643, no. 79)

3.3 Digital skills and inclusion

Education

The time has come for a digital transition in education. The coronavirus pandemic and school closures have provided a major stimulus to digital distance learning and have accelerated the development of innovative plans. In 2020, the government invested approximately €24 million in order to provide 75,000 devices to students, so that they could fully participate in online education.

An ambitious action plan for the digitalisation of education is being prepared within the framework of the Growth Strategy, which should lead to significant improvements in education. This quality improvement will be achieved by providing targeted support to teachers and improving digital learning resources. The Growth Fund committee has made €80 million available for a National Artificial Intelligence Education Lab[32], where innovative digital applications for education will be developed while respecting public values. An additional sum of €63 million has been earmarked to scale up promising prototypes.

At the EU level, too, there is a perceived need to improve the quality and inclusiveness of digital education, working together and exchanging policy practices.[33] As part of its Digital Education Action Plan (DEAP) 2021–2027, the European Commission has announced the creation of a Digital Education Hub. The Netherlands is participating in the associated exploratory study. The EU places a significant emphasis on promoting media literacy, as this contributes to the fight against disinformation and to a functioning democracy. The government-wide approach to disinformation is consistent with this strategy and was intensified in the run-up to the 2021 lower house elections.[34]

Inclusion

Progressive digitalisation may make people more vulnerable, isolated or socially disadvantaged if they do not have access to the necessary digital equipment, connectivity, knowledge or skills. They sometimes require additional support for relevant tasks that are being digitised, such as applying for grants or paying taxes. In terms of digital government, this means that services must be user-friendly, accessible and understandable.

The temporary Digital Accessibility Decree, which requires government websites to also be accessible to people with disabilities, entered into force in September 2020. In addition, 93 physical Digital Government information points have now been opened across the Netherlands to support those who struggle to access digital government services. By the end of 2021, at least 120 library organisations will have an information point.

Accessibility of government websites

Since 23 September 2020, government organisations have been publishing statements on the accessibility of their websites. At that time, the records showed 1,673 statements; by 23 February 2021, there were 2,495. The percentage of statements with A status (fully compliant) and B status (partially compliant) increased slightly in that period, by 2.3%. Since October 2020, organisations that have not yet published a statement have been actively encouraged to meet this statutory obligation.

[32] https://www.rijksoverheid.nl/documenten/rapporten/2020/09/30/verkenning-naar-het-nederlandse-onderwijslab-artificiele-intelligentie

[33] The EU Skills Agenda (Parliamentary Papers II, 2019/20, 22 112, no. 2906) and the EU Digital Education Action Plan 2021–2027 (Parliamentary Papers II, 2020/21, 22 112, no. 2966) published last year provide appropriate frameworks for this approach, alongside incentives and support from new EU programmes such as Erasmus+ and Digital Europe 2021–2027.

[34] Parliamentary Papers II. 2020/21, 30 821, no. 119

Digital awareness is an important tool for understanding the opportunities and risks of digitalisation and is often a significant incentive to learn digital skills. The click-and-tick module Veilig online (Safe Online) has been launched to promote the safe use of the internet and the Digi helpline (0800-1508) has been set up to support people in the safe use of laptops and tablets.

A testing ground environment at Tilburg University is being used to investigate the impact of digital resources on work-life balance, academic performance, social relationships and well-being, with the aim of further improving the support offered, including digital skills courses.

Digitalisation of heritage

The updated version of the National Digital Heritage Strategy 2021–2024 was published on 15 March 2021.[35] This strategy aims to link heritage collections digitally, making it possible for new stories to be told with and about our heritage: by professionals such as journalists, scientists and artists, but also personal stories by heritage volunteers and members of the general public who have an interest in history. Responsibility for implementation of the strategy lies with the Digital Heritage Network, which bases its approach on the principles of sustainability, usability and visibility. The updated strategy has been broadened to include the heritage of the arts sector and creative industry.

#allemaaldigitaal

Public, private and civic organisations are working together to promote digital inclusion as a part of the Digital Society Alliance. The #allemaaldigitaal campaign collects obsolete laptops and tablets from government authorities and businesses. In 2020, it distributed 5,700 digital devices to people who were excluded from working digital or who lacked social contact due to COVID-19 measures. This is in addition to the laptops purchased by the Ministry of Education, Culture and Science for schoolchildren.

Skills on the labour market

Digital skills and qualified ICT staff are an important precondition for a successful digital transition and for our future earning capacity. Digitalisation increases the demand for ICT and digitally trained personnel in all sectors and thus the pressure on the labour market.[36] Around 70% of all ICT staff do not work in the ICT sector itself, but support digitalisation in other sectors, such as health care, mobility and financial services. In research conducted by De Staffing Group in May 2020, 27% of all entrepreneurs surveyed cited a shortage of suitable IT staff as a serious threat to the future of their organisation. The European Commission, too, sees the strengthening of digital skills as an essential precondition for emerging from the crisis. At a national level, the Growth Strategy emphasises the importance of the digital transition in relation to education and the labour market.

As a result of the coronavirus pandemic, a great deal of attention is currently being focused on retraining people who are at risk of losing their jobs. The key challenge here is to scale up effective and successful initiatives such as Make IT Work, Cloud IT Academy and Brightlands Services Campus, which train and retrain people in ICT. A broad coalition of public and private parties is developing a scaling-up plan within the framework of the Human Capital Agenda for ICT. In addition, the *NL Leert Door* (Continuing education in the Netherlands) scheme provides opportunities for free development advice and retraining or further training. Employers in sectors faced with structural labour shortages, such as the ICT sector, can take advantage of a retraining scheme (with €37.5 million in funds and 10,000 places) aimed at hiring and retraining people from other sectors.

[35] For more information, see https://www.kb.nl/nieuws/2021/nieuwe-nationale-strategie-digitaal-erfgoed-2021-2024-ook-voor-cultuurproducerende-sector

[36] The Employee Insurance Agency (UWV) reported in its guidance regarding labour market developments in October 2020 that the greatest shortage is in ICT professions. Source: Committee for Entrepreneurship, State of the SME Sector Annual Report 2020.

To meet the growing need for AI-related knowledge and skills, specific Bachelor's programmes in artificial intelligence have been established and AI has been incorporated into a wide range of courses. AI-related offerings in the context of lifelong development are increasing, and more than 170,000 Dutch citizens have now taken the free National AI Course.

Women in ICT

Only 17.5% of Dutch ICT staff are women. Girls are less likely to undergo technical training and women who do enter the digital sector often switch careers later. The percentage of female entrepreneurs in the digital sector is also growing very slowly. Studies show that female-led start-ups are more likely to succeed than male-led start-ups, and that diversity in the workplace stimulates innovation. The government therefore wants to encourage more girls and women to work and grow in the digital economy and ICT sectors.

Digitally capable SMEs

SMEs play a vital role in the Dutch economy. According to the State of the SME Sector Annual Report 2019, SMEs accounted for 65% of added value and 71% of employment in the business economy.[37] However, the coronavirus pandemic has hit them hard. For many SMEs, digitalisation has become a sprint rather than a marathon. Research by the Chamber of Commerce shows that SMEs have invested heavily in their websites, online marketing and digital customer contact.[38] This is helping them to survive the current crisis, but taking further steps quickly enough remains a challenge, particularly for smaller SMEs.

In collaboration with regional parties, the government has created an almost nationwide infrastructure of 16 SME workshops, in which

[37] Committee for Entrepreneurship, State of the SME Sector Annual Report 2020

[38] Chamber of Commerce, Ondernemen in tijden van corona (Enterprise in the age of the coronavirus) (September 2020).

Farm of the Future (www.farmofthefuture.nl)

The Farm of the Future was officially opened in Lelystad in mid-2020. It serves as an innovation, test and demonstration facility for new circular agriculture concepts in outdoor cultivation. In the 'Nursery', new cultivation systems and precision agriculture applications are developed, of which digital technology and data are key components. Innovations are integrated, validated and demonstrated in the 'Model Company'. The Farm of the Future also functions as a discussion platform and knowledge centre for parties who want to move forward with circular agriculture in outdoor cultivation. The Farm serves as a link in the knowledge and innovation chain for on-farm practice. In 2021, the first steps will be taken towards the creation of a monitoring network and data infrastructure for the development and recording of important crop, soil and biodiversity parameters in new types of cultivation systems, such as strip cropping. This data will be collected in a dashboard that provides insight into the development of the Model Company.

entrepreneurs are assisted by students and lecturers from educational institutions in setting up online marketing and leveraging data within their companies. The ambition is to force a breakthrough by reaching more than 50,000 companies with information in the next three years and to set up 3,500 intensive projects with companies and students ('sprints') in order to make the SME sector at large more aware of the added value of digitalisation and to stimulate SMEs with practical support to make progress in this area.

In addition, pilot projects have been set up to strengthen the impact of the workshops, including one together with the Regional Development Agencies (ROMs) in South Holland (IQ) and the eastern Netherlands (Oost NL) to improve the access of participating entrepreneurs to local ICT offerings (such as software suppliers). In collaboration with the Ministry of Economic Affairs and Climate Policy, Rabobank and the Dutch Transport Operators Association and MKB Nederland (the Dutch SME Federation) has organised a data hackathon to create a closer alignment between existing services and the needs of small businesses.

Dutch Digitalisation Strategy

Government
Transparent and accessible

Education
Higher quality education

Healthcare
Improve quality of life

Agriculture
Sustainable and safe food supply

Mobility
Smart and sustainable

Energy
Flexible energy system for the transition

Industry
Progressive and flexible

SMEs
Digitally skilled

Goals

Foundation

Groundbreaking research and education
Towards a learning and agile economy

Changes in work, new skills and lifelong learning
Everyone should be able to participate

A dynamic digital economy
Competitive, fair and transparent

Strengthening the resilience of citizens and organisations
Digital security and privacy taken care of

Fundamental rights and ethics in the digital age
Trust in the digital future

Connectivity
World-class fixed and mobile infrastructure

3.4 Digital connectivity

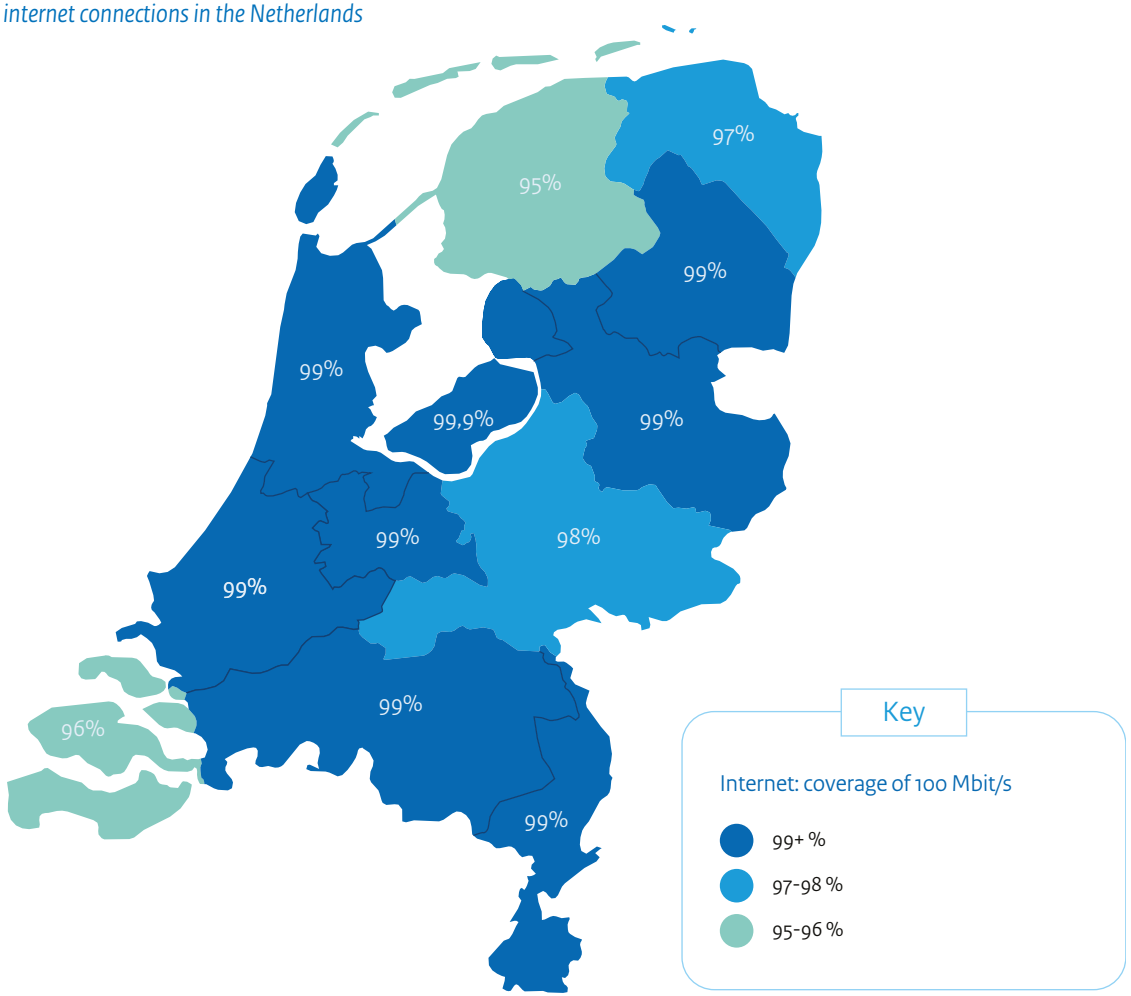
The coronavirus pandemic has dramatically increased domestic and corporate data usage in the Netherlands, with peaks at different times than usual. Working from home and distance learning are the main causes, alongside an increase in digital entertainment. The digital infrastructure, with its fixed and mobile networks, appears to have withstood this stress test well.

Government policy is based on the 2018 Digital Connectivity Action Plan.[39] In order to maintain the Netherlands' leading position and remain at the forefront of digitalisation, high-quality digital connectivity that grows along with the needs of society is essential.

Fixed connectivity: Gigabit is becoming the new norm

In 2020, the construction of new and the upgrading of existing fixed networks continued unabated. The number of households connected to the fibre optic network has seen another surge, due to the further expansion to rural areas and the sharp increase in installation in towns and villages. The cable network in the Netherlands has also been substantially upgraded in many places. In 2020, almost 99% of

Fixed internet connections in the Netherlands



[39] https://www.overalsnelinternet.nl/onderwerpen/kaart-vaste-internetverbindingen

all Dutch households had access to a fixed internet connection with a minimum download speed of 100 Mbps (compared to 96% in 2017) and around half of these households had a 1 Gbps connection[40]. This brings us ever closer to achieving the connectivity target for 2023: all households with a speed of at least 100 Mbps and the vast majority with a speed of 1 Gbps.

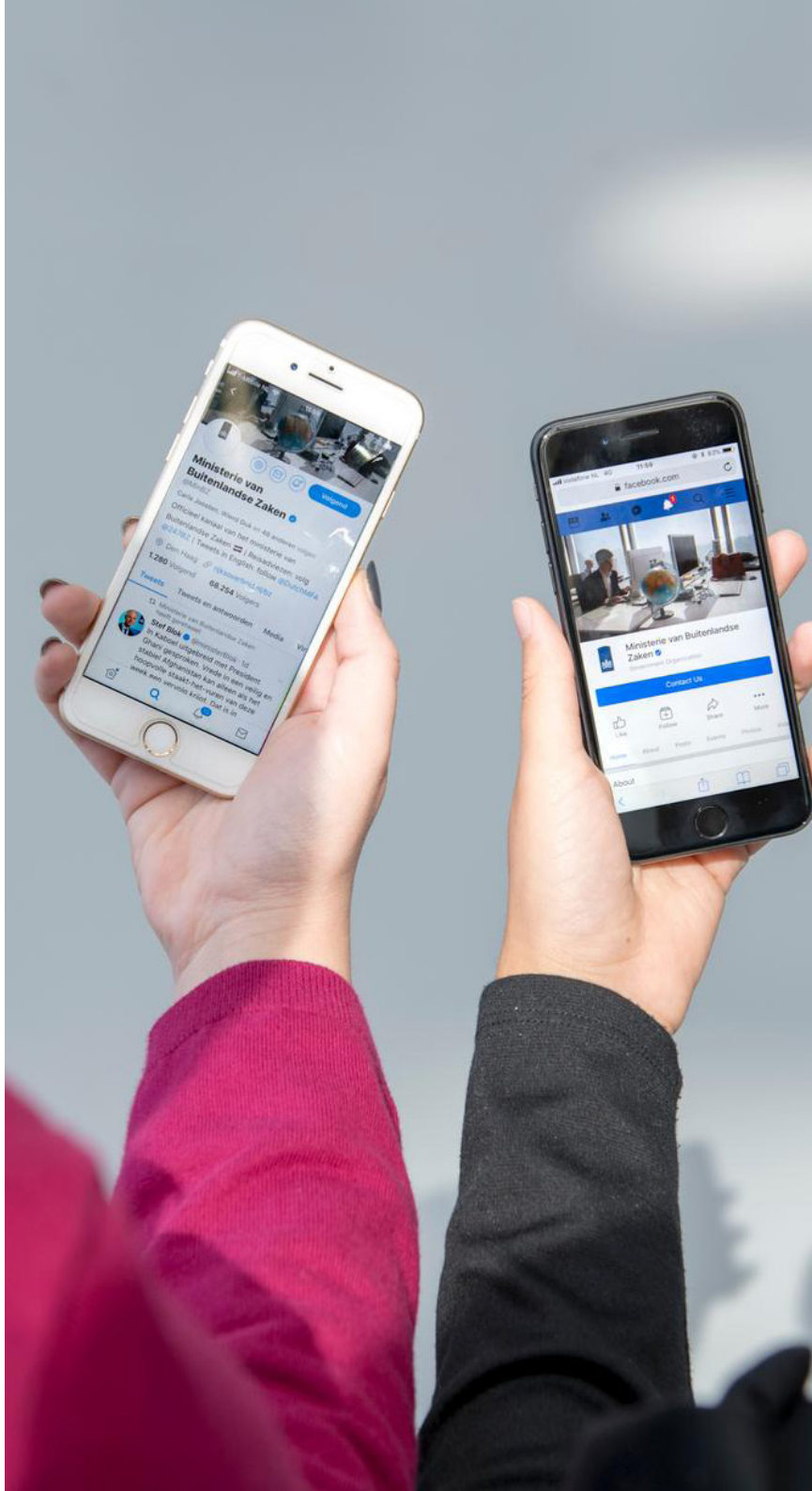
The competition surrounding fibre optics is leading to tensions between the market parties. The Netherlands Authority for Consumers and Markets (ACM) carried out an exploratory study of the fibre-to-the-home market in 2019[41]. In its market study, the ACM did not identify any infringements of the competition rules in the fibre optic market. It did note, however, that market behaviour in city centres can lead to a less extensive roll-out of the fibre-to-the-home network (in the short term) and delays in those areas where the network is already being rolled out. The ACM will publish an update of the study during in 2021.

Given all positive developments, it is essential not to lose sight of those areas or addresses that are difficult to access. Market parties are expected to connect an increasing number of households in rural areas to the fibre-to-the-home network in the coming years, but access to some addresses remains uncertain.[42] We will discuss this issue with the provinces in 2021. In addition, we will investigate which European funds can be utilised to provide these last addresses with high-speed internet.

Mobile connectivity: spectrum allocation and 5G roll-out

The other main goal set out in the Digital Connectivity Action Plan is diverse and high-quality mobile connectivity. Mobile communication service users are increasingly demanding when it comes to the speed, availability and reliability of their connection, as well as the versatility of the service.

The multiband auction for the introduction of the fifth generation of mobile telecommunications technology (5G) took place in the summer of 2020, including the auctioning of the 700 MHz band. Specific coverage and speed requirements were



[40] https://www.acm.nl/nl/publicaties/marktstudie-naar-de-uitrol-van-glasvezel-nederland

[41] https://www.acm.nl/nl/publicaties/marktstudie-naar-de-uitrol-van-glasvezel-nederland

[42] In 2019, the research agency Dialogic calculated that by the end of 2023, there will be approximately 20,000 addresses in rural areas for which access to the network remains uncertain (Source: Dialogic, Notitie Outlook Digitale Infrastructuur Nederland (Memorandum on the Outlook for Digital Infrastructure in the Netherlands), December 2019).

imposed to ensure that the minimum coverage and speed requirements in the Action Plan are met in time. In mid-2020, the three mobile operators started to activate 5G services, which are now available in large parts of the Netherlands.

Allocation of the 3.5 GHz and 26 GHz bands will take place in the coming years. The auction of the 3.5 GHz band is scheduled for early 2022 and the aim is that the 3.5 GHz band can be put into use throughout the Netherlands on 1 September 2022.[43] An initial market consultation was held in January 2020 for the issuance of the 26 GHz frequencies. The results will be translated into policy options that will be put out for consultation again in the first half of 2021. The options will also take into account the long-term vision from the Memorandum on Mobile Communications[44] and the current use of the 26 GHz band. The aim is to issue part of the 26 GHz band by the end of 2021.

With regard to the public debate on the health aspects of 5G, the government has formulated a response to the Health Council of the Netherlands' advice issued in September[45]. In May last year, the Court of The Hague ruled in the action brought by Stop5GNL that the government is adhering to the precautionary principle by applying and monitoring the ICNIRP exposure limits, and by following scientific developments.

Data centres and submarine cables

Data centres have found it more difficult to establish operations in the Netherlands in recent years, due to obstacles relating to spatial planning and energy supply. The National Environmental and Spatial Strategy (NOVI) focuses on a selective growth of data centres at locations where they can meet their energy needs on a long-term basis and where the supply of residual heat is possible. Hyperscale data centres can be set up at locations where there is a large supply of renewable electricity, where a connection to the electricity grid with sufficient capacity is available and where space is less scarce. Preference is given to locations near the Dutch border.

Furthermore, research is being carried out into digital ambitions in areas including innovation of Dutch businesses and other Dutch organisations, such as research institutes, universities and hospitals, in relation to the available data centre capacity. The draft study concludes that the data centre market is largely an international market. The Netherlands utilises capacity in other countries and vice versa.

An increase in European data centre capacity is of interest for all companies and organisations based in Europe. Only a small number of European cities, including Amsterdam[46], currently satisfy the unique conditions for setting up hyperconnectivity data centres. These play a critical role in the transfer of internet traffic within Europe. The study shows that the Netherlands has more available data centre capacity than it uses: an estimated 70% of this capacity is exported to users outside the Netherlands. The Netherlands acts as a data centre 'roundabout' within Europe. Although capacity is not expected to present any obstacles in the pursuit of the Netherlands' digitisation ambitions, given the international character of the market, data centre capacity must be able to continue to grow. If the European data centre market cannot grow, there will not be enough capacity over time to achieve the Netherlands' ambitions. The results of the study will be used to shape business location policy in the Netherlands as set out in NOVI. The study is expected to be published in April 2021.

At the end of 2020, a round-table discussion on submarine cables was held to bring together market

[43] Parliamentary Paper 2020Z25355

[44] Parliamentary Paper 24 095-478

[45] Parliamentary Paper 27 561-51

[46] In Europe, there are five geographical concentrations with very large colocation data centre capacity: Frankfurt, London, Amsterdam (MRA), Paris and Dublin (the 'FLAP-D' cities). In these cities, the quality, reliability and speed of digital connectivity is so high that it is referred to as hyperconnectivity.

parties with an interest in good international connections by sea. The conclusions and agreements reached were confirmed in the Letter to the House of Representatives on Submarine Cables.[47] In order to continue to guarantee the current good international connections in the future, several policy options are being developed, such as permits for landing submarine cables and a telecom corridor in the North Sea.

Local policy: knowledge sharing and harmonisation

In 2020, the Ministry of Economic Affairs and Climate Policy strengthened its cooperation with local authorities by setting up a task force on digital connectivity. As part of this task force, the, the Association of Netherlands Municipalities and municipal authorities are working together on products such as guidelines, sample memoranda and information material to stimulate the harmonisation of local policy on fixed and mobile networks and related issues, such as radiation and health.

Last year, the Ministry of Economic Affairs and Climate Policy also intensified the provision of information to municipalities and citizens on subjects such as 5G, antenna placement, and radiation and health via the website www.overalsnelinternet.nl, newsletters, FAQs, fact sheets, infographics and

[47] https://www.rijksoverheid.nl/documenten/kamerstukken/2020/10/23/kamerbrief-zeekabels-voor-telecommunicatie

videos. In addition, two studies were conducted to provide municipalities with insight into the impact of the European Electronic Communications Code Directive on their implementation practice and on the development of the number of antennas in the coming years.

On 1 January 2021, the new Antenna Covenant came into force. It was concluded for a five-year term. The main alteration is the inclusion of an article on the location of *small cells*.[48] In 2021, the adopted approach will be continued with local authorities and, where relevant, with the market. Work is under way on the further harmonisation of local policy, including fees, municipal antenna policy, degradation and the new municipal tasks arising from the European Electronic Communications Code Directive. The provision of information to municipalities will be continued through the websites and newsletters of www.overalsnelinternet.nl and the Antenna Bureau[49].

Implementation of the Electronic Communications Code (amendment of the Telecommunications Act)

On 21 December 2020, the legislative amendment implementing a number of sections of the new European Electronic Communications Code entered into force. This gives the ACM an additional instrument to regulate network access and ensure competition. The legislative proposal for the implementation of the remainder of the Electronic Communications Code was submitted to the Council of State for advice in December 2020. Among other things, the proposal imposes a requirement on authorities to comply with reasonable requests for the placement of small cells on physical infrastructure controlled by public bodies.

Europe

The European Commission, in its State of the Union, underlined the importance of high-quality digital connectivity and published a recommendation urging Member States to stimulate investment in very high-capacity broadband infrastructure. The European Commission views high-quality connectivity as the most fundamental aspect of the digital transformation and an essential pillar of economic recovery. The recommendation aims to provide a toolbox of best practices to accelerate the deployment of high-speed fixed and mobile networks. Best practices were collected from Member States at the end of 2020. In early 2021, these were condensed into a best practice toolbox, which was published at the end of March.[50] The recommendation builds on the Broadband Cost Reduction Directive, which is also being reviewed this year and for which a concrete proposal is expected by the end of 2021. The Netherlands responded to the public consultation in early March, expressing reservations about including additional obligations in the new directive. Furthermore, the government is with interest looking forward to the new regulation governing roaming charges. The current regulation will remain in force until 30 June 2022.

"Thanks to trial permits facilitated by Radiocommunications Agency Netherlands and access to European and national resources for the funding of pilot projects, we could set the essential conditions to experiment with 5G within the framework of 5Groningen. In addition, the participation of Radiocommunications Agency Netherlands turned out to be a great way to get the national government involved in a regional initiative."

Peter Rake

Programme Manager, 5G
Economic Board Groningen

[48] Parliamentary Paper 2021Z01324

[49] www.antennebureau.nl

[50] https://digital-strategy.ec.europa.eu/en/policies/connectivity-toolbox

3.5 Digital resilience

The Netherlands is highly dependent on digital services, processes and systems, which are becoming increasingly interconnected with physical processes, activities and devices and form part of the global digital space. This development also makes us vulnerable to human or technical failure and to cybercrime, digital espionage and unwanted foreign interference. The digital threat is permanent and cybercrime incidents can cause societally disruptive damage. Fortunately, cybercrime incidents have not yet caused any large-scale societal disruption in the Netherlands, but the possibility that this may occur cannot be ruled out, as evidenced by a number of incidents. Enhancing digital resilience is the most important tool for managing digital risks.

Enhancing resilience

Enhancing digital resilience remains one of the key preconditions for the digitalisation of the Netherlands. Digital resilience requires not only the proper implementation of digital security, but also an ability to respond effectively to cybercrime incidents. The government has been working on this over the last four years, investing €95 million on a structural basis in cybersecurity and, in conjunction with the NDS, developing the Dutch Cyber Security Agenda (NCSA). This has led to numerous initiatives that form the basis for the Netherlands to exploit the economic and social opportunities of digitalisation safely and to protect national security in the digital domain.

Sharing threat and vulnerability intelligence

One of the tasks of the National Coordinator for Security and Counterterrorism (NCTV) is to clarify, expand and strengthen the Nationwide System (LDS) to ensure that information about threats and vulnerabilities can be shared effectively and efficiently. Various parties have a role to play here. The National Cyber Security Centre (NCSC) assists vital providers and providers that are part of central government with information and advice on threats and incidents. The Digital Trust Centre (DTC) was set up to increase the digital resilience of non-vital businesses. Its main tasks are to stimulate partnerships within this target group and to share information and advice. At the end of 2020, the DTC had established 31 partnerships. Practical tools have been developed for sharing general threat intelligence, such as the risk class model[51], the guide for cybersecurity initiatives and the secure commerce basic scan. By developing an information service (expected to go live in the second quarter of 2021), the DTC is meeting the need to share specific threat and vulnerability information with the non-vital business community.

The LDS is constantly evolving and new partnerships are being established on a regular basis. The DTC remains committed to the further development and consolidation of the system, to ensure that as many organisations as possible have a point of contact within it. In addition, information sharing within the LDS is constantly improving. The next step is to obtain OKTT status as an organisation objectively tasked with providing other organisations or the public with information on threats and incidents. In addition, the Cyber Intel/Info Cell (CIIC) has

[51] The risk class model was developed with the Centre for Crime Prevention and Public Safety (CCV).

strengthened cooperation between the operational partners, i.e. the NCSC, the General Intelligence and Security Service (AIVD), the Military Intelligence and Security Service (MIVD), the Public Prosecution Service (OM) and the National Police, with the aim of sharing and analysing the information available to them within the legal frameworks.

Strengthening the knowledge position

A high-quality and autonomous Dutch knowledge position in the field of cybersecurity reduces unwanted dependence on expertise and solutions from abroad.

Dcypher, a new public-private cooperation platform for cybersecurity knowledge and innovation, will combine forces in the fields of research, innovation and education. It will bring together relevant parties, expertise, instruments and resources from the cybersecurity domain in a thematic and chain-oriented approach.[52] The aim is to have enough well-trained cybersecurity professionals and internationally leading expertise in the field of cybersecurity knowledge and innovation in the Netherlands, resulting in effective valorisation in the form of Dutch cyber products and services. The government will drive this development by programming its own knowledge and innovation needs in relation to cybersecurity within the context of the new cooperation platform. Two pilot road maps on automated vulnerability assessment (AVR) and on cryptocommunication have been launched. The number of specific projects and partners associated with the platform is set to grow over the course of 2021.

Supervision of critical infrastructure

In response to the WRR report Preparing for digital disruption (Voorbereiden op digitale ontwrichting), the Minister of Justice and Security has analysed the government's current statutory tasks and powers to identify any necessary additions. This includes the options for sharing information with central government, vital providers and non-vital organisations or – in extreme cases – intervening on behalf of their digital resilience. The exploratory study[53] concludes that the Network and Information Systems Security Act (Wbni) and sector legislation currently offer sufficient opportunities for intervention in the case of critical infrastructure. In addition, efforts are ongoing to improve regulators' insights into their vital sectors. The government is also developing the 'comply or explain' principle, whereby vital providers will be asked to explain in serious cases why they have not followed certain security recommendations made by the NCSC.

"The Online Trust Coalition was launched by the Ministry of Economic Affairs and Climate Policy's Digital Economy Department. It's a public-private partnership with an extensive representation of the European market. The aim is to arrive at unambiguous agreements to make clear that cloud services are both secure and reliable. These are an essential condition for our everyday operations and our digital innovation, so they serve the interests of society at large. As such, they form part of the basis for the DDS."

Online Trust Coalition

Preparing for a digital crisis

As part of the reinforcement tracks of the NCSA, and in response to the motion put forward by Weverling, a training and testing programme has been developed.[54] Practice helps to be prepared if something does go wrong. The cyber exercise ISIDOOR, which will take place for the third time in 2021, forms part of this programme. During ISIDOOR 2021, the National Digital Crisis Plan will be rehearsed with participants from central government, the critical infrastructure and various relevant actors from the National Digital Crisis Plan, such as a number of security regions and computer security incident response teams

[52] Parliamentary Paper 26 643, no. 723

[53] Parliamentary Paper 26 643, no. 738

[54] Parliamentary Paper 26 643, no. 695, appendix.

(CSIRTs). An important element of this years' exercise is the connection between digital and physical. The findings of ISIDOOR 2021 will be incorporated in the update of the National Digital Crisis Plan, which is in the process of being drafted.

Secure ICT products and services

Promoting the digital security of ICT products and services and the Internet of Things is an important part of increasing digital resilience. This is taking shape with the implementation of the Digital Hardware and Software Security Road Map.

In the area of certification, the legislative proposal for the Cyber Security Regulation Implementation Act has been submitted to the Council of State for advice. This legislative proposal creates a national cybersecurity certification system under the European Cyber Security Act. The EU is developing the first cybersecurity certification schemes for this purpose, including for cloud services. Furthermore, the awareness campaign 'Do Your Updates' has been launched to make consumers aware of the need to update smart devices regularly.

In order to include cybersecurity requirements in the government's procurement policy, an expert group consisting of representatives from central government, provinces, municipalities and water authorities has drawn up cybersecurity procurement requirements for 11 different procurement segments, such as cloud services and server platforms.

Empowering consumers in the digital economy

In recent years much has been done to ensure that consumers can confidently make purchases in an online environment. Steps to strengthen the position of consumers have been taken in a number of areas.

The role of platforms and the use of reviews

The Netherlands is currently implementing European legislation that modernises current consumer law, partly in light of ongoing digitalisation. The directive establishes more stringent information requirements and obliges platforms to provide greater transparency on the identity of their suppliers and whether the offering is personalised. In addition, online providers must clarify how search result are ranked and traders are allowed only to post reviews that come from real consumers, who have actually used or bought the product or service. The new rules will apply from 28 May 2022.

The government has also sought national cooperation with platforms. The document Building on trust (Bouwen aan vertrouwen), which has been published in collaboration with consumer rights organisations, manufacturers and platforms, contains practical examples of how these platforms are building consumer trust.

The government has been arguing for some time now for online platforms to have more obligations towards consumers. This issue is being addressed in the European Commission's recent proposal for a 'Digital Services Act'.

Mandatory software updates

European regulations are currently being implemented that introduce new rules for digital content (such as apps), digital services (such as streaming) and goods with a digital element (such as a smart TV). An important change is that consumers will be entitled to security updates for as long as can reasonably be expected. The new rules will apply from 1 January 2022.

Algorithms and AI

In the new European Consumer Agenda, the European Commission states that consumer protection should be included in the development of AI policies. The government will promote this at the European level and will hold talks with companies and consumer organisations at the national level. In addition, the government has commissioned Tilburg University to carry out an assessment of how consumer policy in the digital economy can be made future-proof in light of digital technology and the increasing processing of consumer data.

Product safety and direct imports

Online shopping allows consumers to make purchases worldwide at the click of a button. As a result, containers full of parcels reach the Dutch border every year via direct import (i.e. without the intervention of an importer or distributor). This means that nobody checks whether they comply with European safety regulations.

To tackle the issues associated with direct imports, the largest online platforms that facilitate these direct imports have agreed to the Product Safety Pledge, in which they promise to remove unsafe products from their websites and to comply with European consumer regulations. To ensure more effective supervision, July 2021 will see the entry into force of the new Market Supervision Directive, which requires third-country manufacturers to have a contact point in the EU. A network will be set up with representatives of supervisory authorities and Member States with the aim of conducting joint research projects and sharing knowledge, among other things. The government has asked the Social and Economic Council (SER) to make recommendations on the issues surrounding direct imports. These recommendations will be provided as Dutch input to the European Commission, which will publish the revised version of the General Product Safety Directive in June 2021. Furthermore, the Ministry of Economic Affairs and Climate Policy has made efforts to ensure that consumers are aware of their rights and how to exercise them, as well as of the consequences of 'dropshipping' (online shops that do not hold their own stock and merely forward your order).

A corresponding 'wizard' is currently being tested as part of pilot projects at various government organisations, including ICTU and Logius.

The legislative proposal for the directives on the sale of goods and the supply of digital content is expected to be submitted to the House of Representatives in early 2021. This legislative proposal implements two European directives in the field of consumer protection and explicitly sets out, among other things, a compulsory update regime for digital content and tangible goods with digital elements. This entitles consumers to security updates for as long as can reasonably be expected. The seller/trader will be required to make arrangements with a third party, such as the manufacturer or a software supplier, to deliver the updates. One exception to this is if the trader explicitly informs the consumer at the time of purchase that they cannot expect any updates and the consumer agrees.

Within the EU, the Netherlands is pushing for legal minimum digital safety requirements for smart devices through the Radio Equipment Directive. These requirements are expected to come into force around summer 2021. Following a transitional period, products brought onto the market after that time must comply with these requirements and unsafe devices can be banned from the market and recalled.

A resilient government

The Ministry of the Interior and Kingdom Relations has drawn up an action plan to increase the digital resilience of government authorities. This involves:

1. optimising the connection of all local authorities to the existing cyber and crisis structures;
2. jointly obtaining insight into cyber dependencies within chains of local authorities and the active use of that insight based on the crisis structures;
3. encouraging training and testing by local authorities pursuant to the national training and testing programme. In 2021, exercises will continue to be organised for this purpose on a government-wide as well as a smaller scale.

National coverage system within the government

As part of NL DIGIbeter, the Ministry of the Interior and Kingdom Relations has worked closely with the NCSC to carry out an exploratory study of the way in which the national incident response capacity system is organised within the government and what steps can be taken to optimise this system by sectoral CERTs (computer emergency response teams), such as the municipalities' Information Security Service (IBD) and the water authorities' Water Management CERT (CERT WM). Partly on this basis, the Ministry of the Interior and Kingdom Relations has granted a subsidy for research into the possibilities for connecting the provinces to the Nationwide System of cybersecurity partnerships. The provinces will carry out this exploratory study in 2021.

Government-wide cyber exercise

A follow-up to the government-wide cyber exercise is scheduled to take place in 2021. Administrators, managers and professionals from central government, the provinces, municipalities and water boards will once again rehearse for a cybercrime incident with the aid of a fake incident that will be reproduced as realistically as possible. This year, for the first time, the exercise will include an inter-administrative testing programme.

In addition, government authorities are increasingly carrying out exercises on a smaller scale. The Ministry of the Interior and Kingdom Relations has granted the Institute for Security and Crisis Management a subsidy to develop three cyber training packages for municipalities and provinces.

Basic framework for information security within government

The Government Information Security Baseline (BIO) is the basic system of standards for all levels of government (central government, provinces, municipalities and water boards).
An Inter-Administrative BIO Support Programme was implemented in 2019 and 2020. A large number of resources have been developed and collected on the BIO portal www.bio-overheid.nl, in collaboration with the Centre for Information Security and Privacy Protection (CIP).

European and international cooperation

European cooperation is taking place on a number of topics relating to digital security and resilience. One example is the joint development by European countries of a toolbox of mitigating measures relating to the cybersecurity of 5G networks. The European Commission has presented a new proposal for the European Directive on the security of network and information systems and published a new cybersecurity strategy. The government welcomes these proposals and will be closely involved in further negotiations.

In September 2020, the Netherlands organised the high-level EU cyber crisis exercise Blue OLEx. During this exercise, a new EU cyber crisis management network, the Cyber Crisis Liaison Organisation Network (CyCLONe), was launched to strengthen strategic cooperation on cyber crises.

Furthermore, an agreement was reached in 2020 on the establishment of the Cybersecurity Competence Centre (CSCC) to strengthen and disseminate cybersecurity expertise within Europe. In cooperation with national coordination centres, the CSCC will help the EU to pool its expertise in cybersecurity, technology and industry development and bring together key stakeholders in a European cybersecurity competence community. Participants in this community come from the business sector, knowledge institutions and governments[55]. The CSCC will also provide cybersecurity-related financial support under the Horizon Europe and Digital Europe (DEP) programmes.

Finally, the European Commission has presented a new proposal for the European Directive on the security of network and information systems and published a new cybersecurity strategy.[56] The government welcomes these proposals and will be closely involved in further negotiations.

[55] See also New Cybersecurity Competence Centre and Network – CyberCompetenceNetwork

[56] Cybersecurity | Shaping Europe's digital future (europa.eu)

3.6 Digital government

Every year, the Government-wide Digital Government Policy Dialogue (OBDO) drafts the Digital Government Agenda: NL DIGIbeter. The main themes of the agenda are digital inclusion, digital innovation, public values and fundamental rights, digital resilience and digital identity.

Deploying innovation to tackle societal challenges

The government stimulates innovative projects to improve the digital government. In 2020, circa €5 million was distributed to 24 projects and completed by the end of 2021. In February 2021, applications opened for the third round of the Innovation Budget. One of the outcomes of the first round is that farmers and horticulturalists in 14 water boards, are able to exchange information with the water board using the Perceelwijzer (Plot Guide) app.

As part of the inter-administrative Start-up in Residence programme (SiR), social challenges are tackled by start-ups. Start-ups can scale up their projects if they show a successful proofs of concept.

n addition, the SBIR subsidy instrument is being used to encourage SMEs in particular to develop innovative digital solutions for the government. SBIRs have already been launched on the themes of data landscape, AI in the public sector, and new technologies for inclusion and lifelong development.

Smart search of archives

Handwritten Text Recognition (HTR) makes it possible to search word by word through more than a million scans of historical texts from the Amsterdam City Archives, the National Archives of the Netherlands and the North Holland Archives. However, searching by location is problematic for several reasons, although there is need for. Location-based searching has been made possible in a prototype search environment where scans, transcripts, historical maps and images can be explored. The digital search environment was created by a consortium of heritage and AI specialists, consisting of Aincient, Picturae, Sioux Technologies and Islands of Meaning. This project was made possible by the SBIR programme for AI in the public sector.

A reliable generic digital infrastructure

In the context of the Long-Term Programme for Digital Government Infrastructure (MIDO), ministries, implementing organisations, local authorities and private parties are working together to modernise the generic digital infrastructure (GDI). As part of MIDO, an annually updated basic infrastructure programme plan provides a comprehensive insight into GDI management and operations, programmes and projects. The GDI consists of generic agreements, standards and facilities that enable citizens and businesses to communicate with the government in a reliable and secure manner.

Better government services through digitalisation

The digitalisation of government services are progressing steadily.

The Senate is currently debating the Digital Government Act (WDO). This Act provides for a secure and reliable digital infrastructure for the government and ensures that citizens have the same rights and guarantees in their digital communication with the government. The legislative proposal on the Electronic Administrative Communications (Modernisation) Act, which gives citizens and businesses the right to send electronic messages to the government, is being debated in the House of Representatives. The Electronic Publications Act is expected to enter into force on 1 July 2021, requiring governments to publish all general notices and announcements centrally and electronically. Citizens with a *MijnOverheid account* will automatically receive emails alerting them to posts concerning their residential environment.

Efforts are being made to improve government services by increasingly organising these services around private affairs (such as death or divorce) and entrepreneurship (starting a business). For example, businesses can verify whether someone has died directly at the CBG Netherlands Centre for Family History, meaning that next of kin no longer need to send them a death certificate. Those information can be found on the websites ondernemersplein.nl and rijksoverheid.nl.

Key registry system

An inter-administrative programme plan to improve the key registry system was drawn up in 2020 under the auspices of the Ministry of the Interior and Kingdom Relations. This data is widely used both within and outside the government. However, improvements are needed to make the data usable across sectors in order to tackle societal challenges such as the energy transition, the implementation of the Environment and Planning Act and residential construction.

Through the activities in the programme plan, recommendations made by the Netherlands Court of Audit on access to and correction of data, re-use of data and quality management are being implemented. January 2021, marked the introduction of

the Key Register Error Reporting Centre[57], which ensures that citizens and businesses are helped by the right authority in the event of errors in the key registers.

In 2020, the Ministry of the Interior and Kingdom Relations collaborated with users to produce a Development Agenda[58] for the step-by-step improvement and modernisation of the Key Register of Persons (BPR). In preparation, initial steps have been taken to obtain better insight into the accommodation of labour migrants in the Netherlands, as one of the measures arising from the government's response to the advisory reports[59] issued by the Labour Migrants Protection Taskforce.

Digital identity

The main objective on the issue of digital identity is that all citizens are able to interact or enter into transactions with the government and others in a secure, reliable, accessible, understandable and personal way.

The government has made great progress in this area over the last few years. The Digital Government Act sets out the principles, responsibilities and foundations of the GDI facilities. The Act is the foundation on which the digital access system will be built. Under the amended Passport Act, Dutch citizens will be able to apply for ID cards with a chip ('eNIK') from their municipal authority as of 2021. This will enable them to log in more reliably via the DigiD app to public and semi-public sector services.

The use of DigiD, and specifically the DigiD app, has increased significantly in recent years. More than half of the Dutch adult population now use the DigiD App. There has also been a significant increase in the number of companies using eRecognition tools, which offer them a simple, reliable and secure way to manage their affairs with the government.

[57] Key Register Error Reporting Centre launched | News report | National Office for Identity Data (rvig.nl)

[58] Letter to the House of Representatives on the status of the Key Register of Persons (BRP) | Parliamentary Paper | Rijksoverheid.nl

[59] Government's response to recommendations made by the Labour Migrants Protection Taskforce | Parliamentary Paper | Rijksoverheid.nl

Open standards and source codes

The Dutch government has been encouraging the use of open standards in its own domain for years.

The Standardisation Forum advises on which open standards will receive 'comply or explain' status, supports public bodies in applying open ICT standards and reports annually to the House of Representatives. Significant improvements were made to the national portal for open data, data.overheid.nl, in 2020.

In April 2020, the government introduced the 'open, unless' policy with regard to source codes used by the government. The basic principle is that software developed using public funds should be made available to society wherever possible. In the past year, several studies have been conducted for this purpose, a government-wide learning community has been introduced and several legal issues have been elaborated in greater detail. This has led to a better understanding of the potential impact of open source and offered insight into the most appropriate policy interventions.

Government data

In 2020, the government presented the House of Representatives an update on the NL DIGITAL: the Government Data Agenda. The data agenda deals with open and closed data, the relationship with new technology and a data-driven approach. It contributes towards the effective and responsible use of data, algorithms and source codes by the government, for example in the case of specific social challenges such as the energy transition and – of course – the coronavirus pandemic. The Data-Driven Approach Learning and Expertise Centre assists government organisations in these areas.

Currently, the Ministry of Internal Affairs and Kingdom Relations develops the Inter-Administrative Government Data Strategy (IDO). The strategy is in line with the Dutch Digitalisation Strategy and the Strategic Action Plan for Artificial Intelligence.

The IDO aims to provide further direction and an answer to the question: how can we help to tackle societal challenges by fully utilising the potential of data in a responsible way? Through the IDO, government authorities' aim is to build on each other's solutions and to tackle shared challenges together. For example, the government needs to make it easier to exchange data and also need to assess carefully the possibilities; what is permissible and what is desirable when using data to address social challenges. The aim to inform the House of Representatives is in the second quarter of 2021, being part of the NL DIGITAL: the Government Data Agenda.

In the context of the Organisation for Economic Co-operation and Development (OECD), the Netherlands delivered ethical data principles for the use of data by government authorities in early 2021. International cooperation on the digital transformation of government is taking place within the Coalition of the Willing: a knowledge-sharing partnership of eight European countries.

The EU e-government action plan focuses on digitalisation in the public sector and will be updated and broadened, due to the fact that new technologies are playing an increasingly important role in public services,. The Netherlands takes an active part, for example in relation to issues such as interoperability, digital identity and new technologies.

In Europe, the Single Digital Gateway (SDG) brings together all government information and procedures for citizens and businesses in one online location. The revamped Your Europe portal went online in December 2020. Member States are now working hard to make the relevant web pages SDG-proof and to give notice where this process has been completed. Local authorities have until the end of 2020 to adapt the information they provide to the SDG requirements. By the end of 2023, procedures covered by the SDG must be digitised and the technical system supporting the once-only principle will be up and running. An EC implementing act that will clarify the applicable framework is expected in mid-2021

3.7 Operational level: digitalisation at all levels

Digitalisation and the associated policy-making is taking place at all levels of government. The DDS brings together the digitalisation policy of central government, but other levels of government are also working on digitalisation. The central government is collaborating closely with other authorities to make digitalisation work for the Netherlands, each within their own role and responsibilities.

There is a strong focus on scaling up successful local initiatives and sharing knowledge at regional and local governmental levels. At European level, important legal frameworks are being established and major investments are being made. At international level, the emphasis is shifting from seizing opportunities to a focus on Europe's own position in a global playing field. Digital sovereignty has become a key issue.

Central/Regional Government Cooperation Agenda

Central and regional authorities recognise the vital role of digitalisation in determining the competitive position and earning power of the Dutch economy. Both levels of government are therefore actively pursuing policies aimed at increasing knowledge and the application of digital technology and increasing digital activity.

The provinces and central government are working together in areas such as connectivity, the application of key technologies, data-driven policy and digital skills for the labour market. At the annual Dutch Digital Conference, provincial administrators discuss digitalisation plans, results achieved, obstacles and opportunities with the State Secretary for Economic Affairs and Climate Policy.

During this conference, it was agreed that central government and the regions will develop a shared philosophy on how to set up a coherent national-regional ecosystem for digitalising the economy. The SME Central-Regional Economic Cooperation Platform will start in this area.

Breda Robotics

Breda Robotics established last year as a new Smart Industry Field Lab, aims to stimulate robotics in the region. This field lab is an initiative by parties including the municipality of Breda, Avans University of Applied Sciences, REWIN, ExRobotics, WWA and Synchronlab, and was set up to strengthen the robotics cluster in West Brabant by stimulating robotisation in this region through the facilitation and development of robotics and other industry 4.0 technology. Aimed at the manufacturing and maintenance industry and vocational education, the field lab offers an inspiring place to work and train and seeks to connect talents in the region. Breda Robotics connects, inspires and answers questions relating to robotisation and automation.

Examples of specific actions that are already being jointly implemented (financed using EU funds, with co-financing from the central government, the region and regional knowledge institutions) are the Smart Industry field labs and hubs, and AI hubs.

The Smart Industry programme is coordinated at national level and currently includes five regional Smart Industry hubs and 46 field labs. Turning each field lab into a skills lab means that those employed in the private sector can be trained in the skills they need to work with Smart Industry technologies. This is now being done in 30 field labs. The Smart Industry programme seeks to work with regional educational parties to give the skills programme an extra boost. From this local base, the programme tries to affiliate with the newly established European Digital Innovation Hubs (EDIHs) for the application and dissemination of technology. These connect seamlessly to the five existing Dutch Smart Industry Hubs. The EDIHs can use innovation experts to assist companies with their digital transition. The European selection process will start in the first quarter of 2021 and the Netherlands will submit proposals.

Smart City Living Lab Scheveningen

In 2020, the Smart City Living Lab Scheveningen (LLS) created, a partnership between the Municipality of The Hague, the Province of South Holland and the Metropolitan Region of Rotterdam-The Hague. The LLS tackles metropolitan challenges with smart solutions based on the latest technologies. Examples include a robot that collects litter and digital wristbands that make it easy to find lost children. The LLS helps to acquire new knowledge about the use of digital innovations in the city. This technology is used to gather, process and apply data about citizens and their environment. This calls for extra attention to responsible use. It is important that the parties involved gain experience and learn how to leverage the social and economic added value of 'Smart Cities' in practice.

Europe: setting frameworks

The foundations for the Dutch legislative framework for digitalisation are often laid within the laws of the European Union. In terms of the free movement of data between EU Member States, for instance, this means strong and clear-cut privacy legislation, copyright and responsibilities imposed on platforms. In addition, the European Union encourages joint research and innovation programmes, standardisation and a common approach to cybersecurity. The European Union is a crucial operational level for digitalisation, at which we are constantly redefining the Dutch position. We do this while taking into account the influence of 'European' measures on the Dutch earning capacity. The European Commission has a clear desire to function as a market supervisor in the digital domain. Under the leadership of Ursula von der Leyen, the European Commission started formulating a long-term strategy on digitalisation in 2019 encompassing a digitalisation strategy, a data strategy, a commitment to AI, a digital skills agenda and a cybersecurity strategy. The European Commission also views digitalisation and sustainability as a 'twin challenge': the two major transitions Europe must undergo in the coming years and are inextricably linked. The next few years will be marked by new and revised European legislation in areas such as clearer responsibilities for platforms, an ethical and human-centric approach to AI and conditions for European data sharing, as well as investments, including in research and innovation, through the Horizon Europe programme and the Recovery and Resilience Facility Fund (RRF).

In view of the current and upcoming new legislative proposals, the Netherlands wants to discuss the important issues associated with digitalisation in a European context, so we can act together where possible. The government's commitment to these efforts will be in line with the DDS: European citizens and businesses must be able to take full advantage of the opportunities offered by digitalisation to ensure that Dutch and European industry can remain globally competitive and we are able to tackle the major societal challenges that face us. At the same time, public interests and basic rights must continue to be safeguarded effectively. On the one hand, Europe must develop a clear, future-proof framework that strengthens innovation and the earning capacity of the Netherlands, with the right preconditions. On the other hand, Europe must increase its influence on the global processes of technological development, either through the Commission or through the joint Member States. In this respect, Europe must ensure that public interests and basic rights are respected.

The major strategies for the 2019–2024 Commission mandate have been published. Currently the proposals are further specified and developed. The first legislative proposals, such as the Data Governance Act, the Digital Services Act and the Digital Markets Act, have already been published. More proposals will follow. Other policy frameworks will also be renewed, such as the eGovernment Action Plan and the Skills Strategy. The Netherlands is actively participating in the negotiations on these proposals in the Council of the European Union.

Europe: political priority and funding

The need to accelerate the digital transition for the benefit of economic recovery has been emphasised at the highest political level within the EU. For example, during the European Council of October 2020, European government leaders, including the Netherlands, expressed their support for the proposal to make at least 20% of the Recovery and Resilience Facility (RRF) funds available for the digital transition. RRF funding to the sum of €5.5 billion has been allocated to the Netherlands, of which €1.1 billion must be available for digitalisation. The European Council also called on the Commission to set digital targets for 2030. On 9 March 2021, the European Commission published its vision, targets and action plans for Europe's digital transformation by 2030 entitled 'Europe's Digital Decade: Targets for 2030.[60]

The Netherlands is positively stated about the specific timelines being attached to the prioritisation of digitalisation and the associated EU capacities in the areas of connectivity, skills and digital public services. This requires the right financial investments. The government welcomes the agreement reached on the Multiannual Financial Framework (MFF) 2021–2027, in which digitalisation is a key topic – including in the funds of the Horizon Europe programme, of which the Netherlands is a net beneficiary. The government will actively promote these schemes to Dutch businesses and researchers. In addition, the new Digital Europe Programme (DEP) offers opportunities for testing and facilitating digital applications for Dutch businesses in close alignment with the DDS priorities, with a particular focus on SMEs. The Netherlands will provide €50 million in public co-financing for the DEP programme over the period 2021–2027.

Artificial Intelligence for Digital Twins (AI4DT)

In the international AI4DT Field Lab, Baden-Württemberg and North Brabant joined forces to provide better support for SMEs in these regions in the application of Artificial Intelligence and Digital Twinning. This partnership came about as a result of collaboration between the NL Smart Industry programme, the Fraunhofer Institut für Produktiontechnik und Automatisierung-Stuttgart, Steinbeis Transferzentrum für Industrie 4.0 und Digitalisierung, Brainport Industries, the Field Labs and educational institutions on the Brainport Industries Campus, the Baden-Württemberg Ministry of Economic Affairs, Labour and Housing Construction and the Province of North Brabant.

Digital Twins are digital copies of physical products and production processes. This development is essential for 'right first time' development processes and customer-specific and error-free production. Linking the models to real-time information and applying AI tools makes it possible to optimise processes, equipment and can improve productivity up to 25%.

SMEs face many barriers before investing in this technology. The AI4DT Field Lab seeks to remove these barriers. The aim is to apply the technologies, know-how and best practices built up in the Field Lab in the Netherlands and Germany. Subsequently, the intention is to extend their application to the European level. Businesses are brought into contact with each other through network meetings, active matchmaking, virtual forums and expert panels with the aim of transferring knowledge, developing specific projects and organising visits to businesses and knowledge institutions.

[60] See https://ec.europa.eu/info/strategy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_nl

Global: foreign trade and development cooperation

The Policy making for foreign trade and development cooperation is also affected by digitalisation. A Digitalisation Agenda was drawn up for collaboration in 2019 with developing countries, to promote the Dutch foreign earning capacity. One of the results in the latest progress report of March 2021[61] is the adopted joint approach in the agenda. This approach leads to more coherent action, for example through a coherent programme of investments in education, digital entrepreneurship, digital trade, infrastructure investment, security and online freedom to reduce the digital gap between the developing and developed countries.

Global: internet governance – functioning of and on the internet

At global level, the Netherlands continues to work actively towards an open, free and secure internet in view of geopolitical developments and the international market power of the tech conglomerates. This requires more international cooperation than ever. In September 2019, the UN Secretary-General published a road map for digital cooperation, calling for the strengthening of the global Internet Governance Forum (IGF). A Tech Envoy has been appointed, whose brief includes increasing the

[61] Parliamentary Paper 34 952, no. 129

impact of the IGF's work. The starting point for global internet policy remains the multi-stakeholder approach, based on cooperation between governments, civil society, businesses, academia and the technical internet community.

The Netherlands opts for a limited but appropriate government role in internet governance and promotes the multi-stakeholder approach to avoid unilateral dominance with regard to the technical functioning of the internet. However, the strategic importance of the internet has increased and the open, free and secure internet is consequently under pressure. Many stakeholders are involved in the functioning of the internet and, given its complexity, it would be undesirable for one or more multilateral organisations to be responsible for its management. The government actively participates with the Dutch multi-stakeholder community in these organisations where possible.

When it comes to applications on the internet, a stronger and more leading role by the government is justified in view of the posted material on the internet and offered services. However, the basic principle of an open and free internet, which is the starting point of the underlying technical infrastructure, must be respected at all times. In any event, it is important to avoid a situation in which the global internet turns into a 'splinter network', where each region has its own rules and where a globally open, free and secure internet further disappears from view.

Global: technological development and standardisation

The development and innovation of the internet depends on standards and protocols. These are the result of research and product development by a wide range of organisations and businesses and are eventually 'adopted', either formally or informally. Increasingly, state actors are influencing this process to incorporate political, cultural or social characteristics into technical standards. This can be incompatible with Dutch values such as privacy, freedom of expression and open access to the internet. In 2019, for example, non-Western-oriented countries were already making proposals for facial recognition and an internet protocol with a high level of traceability. This development coincides with the withdrawal of many private parties who were involved in standardisation, mainly due to cost considerations. As a result, large multinational tech companies have gained the upper hand. In order to safeguard public values and prevent undesirable manipulation, the Dutch government needs to participate more actively in standardisation organisations such as ITU and ETSI.

This will require technical expertise and knowledge of existing standards. Therefore, closer cooperation will be sought with those parties who can interpret and help to determine the technical aspects of the standards.

Operational levels

Examples of digitalisation at all levels

Regional

Innovation in action

Smart Industry programme

5 regional Smart Industry hubs

46 field labs

Innovation budget

SME workshops

Scaling up successful local initiatives

National

DDS and cooperation

Coordination of digitalisation policy

Dutch Digital Conference

Legal frameworks and supervision

Telecommunications Act

Digital Government Act

Enforcement on cybersecurity of essential services

National-regional cooperation

A strong digital ecosystem for the Netherlands

Strong effort at the European level

European

European digitalisation budget

Accelerating the digital transition | Economic recovery

20% of Recovery and Resilience Facility (RRF) funds earmarked for the digital transition

R&D investments through the Digital Europe Programme and Horizon Europe

Legal frameworks

Long-term strategy
Digital and green transition

Platform responsibilities

Human-centered approach to AI

Conditions for Europe-wide data sharing

International

Governance of the internet

Basic principle
Open, free and safe internet

Digital cooperation

IGF, ICANN, IETF, ITU ...

Multi-stakeholder partnership between governments, civil society, businesses, academia and the technical internet community

Telecommunications and internet standards

4. Study 'Outlook Digitalisation 2030' key findings

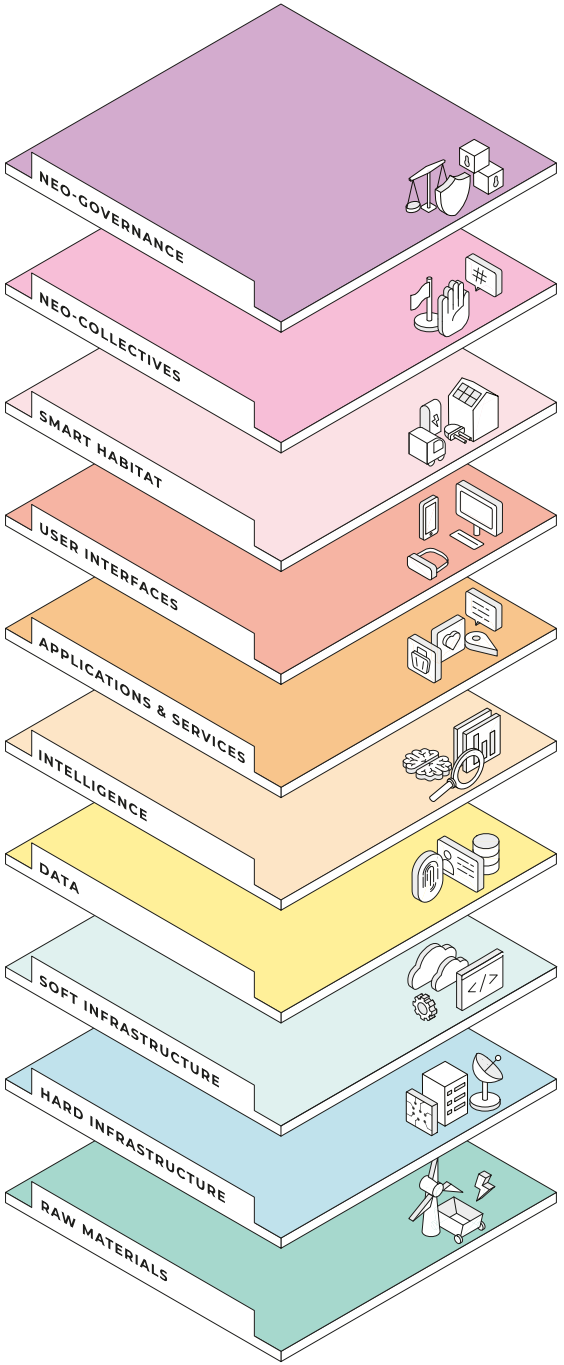
The transitional period towards a new government is an excellent opportunity to look towards the future. Technological, economic and social developments are moving fast and have an impact on the nature, pace and direction of the digital transition. The opposite is also true. It is important for government and society to prepare for this impact at an early stage. After all, digitalisation is a long-term development that has a major impact on everyone. The government has therefore commissioned a future study on the key trends and developments in the run-up to 2030. The aim is to provide insight into how these trends and developments relate to each other, so future governments, businesses, knowledge institutions and citizens can discuss the main important issues: what are we aiming to achieve through the digital transition? What steps do we need to take, now and in the future, to succeed in this together?

FreedomLab has carried out this future study aimed at obtaining an overview of the situation. The full report will be published as an appendix to this DDS update. A summary setting out the key findings of the report can be found below.

Outlook Digitalisation 2030: a summary[62]

The digital transition is unfolding at a high pace. Technological, economic and societal developments are occurring in rapid succession and together give shape to our digital future. Consequently, it is vital for government and society to gain perspective on possible developments, prepare themselves for the future and, where necessary and possible, redirect developments.

In view of this, the government has ordered a study into the most important trends and developments leading up to 2030. Based on eleven trends, Outlook Digitalisation 2030 paints a picture of our digital future. The study thus aims to provide an overview of the main opportunities and risks of digitalisation, but also to bring to light critical uncertainties and questions. The full report can be found in the attachment, and a succinct account of the most important findings is given below.



[62] This summary was authored by FreedomLab.

Most important trends

In the study, eleven dominant trends are identified. They spring from technological developments in and between different layers of the so-called digital "Stack". The Stackdescribes digital technology as a layered system of modular components; from raw materials to digital services, new cultural collectives and innovative models of governance. This approach enables us to think systemically about digital innovation, what role scale and network effects play in it, and the transgressive nature of digital technology.

Besides technological innovation, the trends are the consequence of societal developments as well. With every trend, there are various societal forces at play that either accelerate or slow down the trend, but also give it shape and direction. Based on a review of the literature and interviews with experts within and outside the Dutch government, the following trends are identified:

1. **Mega-ecosystems:** Different services are integrated into a single "super-app" that gives users direct access to, for instance, mobility, entertainment or insurances. This integration results in an optimal user experience and also creates opportunities for sustainable revenue models, such as mobility-as-a-service. This does, however, threaten the Dutch earning capacity, as it subordinates service providers to the platform. Furthermore, it gives rise to risks concerning privacy and the autonomy of citizens.

2. **Decentralisation:** Growing resistance to the power of large tech companies is paving the way for radical alternatives to the current internet with its winner-takes-all dynamic. Based on new design principles in which institutional innovation is embedded in technology, decentral solutions are emerging with regard to data storage, intelligence and applications.

3. **Data-sovereignty:** The increasing importance of data to economic and societal goals is making us reconsider the value and accessibility of data. Citizens, companies and governments are obtaining data sovereignty and are enabled to make deliberate choices respecting information that's available to others.

4. **Digital currencies:** Cryptocurrencies could potentially enable transactions without the mediation of banks at very low cost. This is giving rise to new revenue models and remuneration structures. At the same time, cryptocurrencies could disrupt financial markets and are threatening to sideline existing players and watchdogs.

5. **Compelling data:** Smart cities, houses and factories generate a stream of data. Aided by artificial intelligence, this data will make our living environment increasingly predictable and more easily governed. This development

raises questions with respect to the "power" of data and the limitations of technological solutions.

6. **Autonomisation:** In the coming years, artificial intelligence will increasingly come to act independently. At first, this will be limited to "innocuous" applications, but more complex tasks will gradually be added, and the technology will pervade our lives more deeply. However, it is still unclear whether and if so, how, we will be able to live alongside these machines and where we will draw the line as regards their responsibilities.

7. **Swarm culture:** Digital platforms bring people together, introduce new forms of collaboration and thus contribute to the rise and spread of new ideas. This dynamic will accelerate in the coming years, among other factors because of the advent of new interfaces, such as augmented reality that adds a digital layer to our physical reality, and low-threshold applications of artificial intelligence (e.g. deep fakes).

8. **Virtual living environments:** New generations of social media and games are creating virtual worlds, where users have meaningful experiences and develop new practices. Entertainment, work and education are thus shifting to the digital realm. This means that an even bigger part of our lives will take place beyond the reach of governments and digital platforms will become even more powerful.

9. **Optimisation of humans:**Intimate technology is helping us to overcome our physical and cognitive limitations. New interfaces are ancillary to our senses, robotics strengthen us physically and we perceive our dealings with digital assistants to be an extension of our cognitive capacities.

10. **The battle of the Stacks:** Superpowers are developing their own Stacks and attempting to make them the global standard. This is not merely a battle for economic and international power, but also a battle of ideas about the way we organise our society and the role we assign technology in this.

11. **Vulnerability:** The digital transition is making us increasingly dependent on technological systems and their developers. As a result, society and the economy are vulnerable in trade conflicts, but also to cyber espionage, sabotage and terrorism. A seemingly insignificant event such as a hack or programming error could have dire consequences.

Possible scenarios for the future

No unambiguous image emerges from the trends described and the analysis of the possible consequences of digitalisation. The trends differ too much for that and every trend is subject to many uncertainties and several divergent development paths are conceivable. Nevertheless, the different trends do bring to light what opportunities and threats could present themselves regarding the Dutch earning capacity, public administration, comprehensive wellbeing, public values and our security.

Based on the trends and underlying uncertainties, the researchers formulate four different scenarios for our digital future. In these scenarios, two questions are paramount: Which actors are leading in the digital transition and what is the purpose of the process of digitalisation? The first question specifically aligns with concerns prevalent today in respect to our dependency on a small number of (non-Dutch and non-European) companies that increasingly determine the rules of play in the digital transition.

The second question is closely linked to this and pertains to the role of digitalisation in furthering equal opportunity and sustainability. Therefore, in the scenarios, the most important infrastructure and platforms remain in the hands of private parties or in fact become (semi)

publicly governed, and digitalisation contributes first and foremost to economic growth or, conversely, to comprehensive well-being. These scenarios are as follows:

- **Acceleration:** The digital infrastructure and predominant platforms are still in the hands of the large international tech companies, but the sector has shown self-correcting ability. Pressured by employees, service providers and users alike, they have become more reticent when it comes to gathering data and more transparent regarding algorithms. They have thus managed to stay ahead of the call for stricter regulation and prevent the alternative platforms, which are based on cooperation, from infringing on their position.

- **Conditional growth:** The internet as an unregulated free state ceases to exist. It did not work for its users, had negative effects on society and compromised the Dutch and European earning capacity. Europe has therefore proceeded to implement more stringent regulation in regard to online activities and the platforms on which they occur. These regulations pertain to the handling of data and the use of algorithms, but also specifically to the impact of digitalisation on our living environment and ourselves. European companies are thriving on this internet and are gaining ground elsewhere in the world.

- **Radical markets:** It was the market that produced the tech giants and it is the market that seems to be dismantling them. Whereas the rise of cryptocurrencies was initially seen as a speculative bubble, in hindsight, it can be said to have been a public capital injection to develop a new Stack, also known as web 3.0. An open-source infrastructure facilitates all kinds of functions, such as financial transactions and data management, without the mediation of central parties. Many of the principles of web 3.0 appear to be in alignment with the new European initiatives for a common digital market.

- **Responsible together:** The hope that the digital transition would automatically lead to societal progress and better comprehensive well-being, has given way to the realisation that society must actively give shape to its digital future. To this aim, forms of public-private collaboration are arising in which technological innovation goes hand in hand with social, economic and institutional innovation. Openness and transparency, moreover, allow for the public-private initiatives and their solutions to be scaled up more quickly (internationally).

Appendix

Appendix 1: Progress Report Digital Connectivity Action Plan

1. Capitalising on (accelerating) social and economic opportunities

Domain & ambition	Actions outlined in the DDS 2018	Current status and results	What are we going to do?	Who (timeline)
A digitally capable SME sector The government supports the SME sector in its transition to a digital economy	1 The 'accelerating digitalisation in the SME sector' programme.	• The last government term saw the organisation of 16 regional SME workshops as part of a grant scheme, in which entrepreneurs are being assisted by students and lecturers from educational institutions in setting up online marketing and leveraging data within their companies. In addition, a pilot project was set up with the Regional Development Agencies (RDAs) in South Holland (IQ) and the eastern region of the Netherlands (Oost NL) to enhance the impact of the SME workshops by improving the access of participating entrepreneurs to the local ICT sector (such as software suppliers). • In addition, a data hackathon was organised by MKB Nederland (the Dutch Federation of Small and Medium-Sized Enterprises) in collaboration with the Ministry of Economic Affairs and Climate Policy, Rabobank, and the Dutch Transport Operators Association. This event focused on creating a closer alignment between existing digitalisation services and the needs of small businesses. • Finally, efforts have been made to provide additional information in collaboration with the Chamber of Commerce. The Chamber of Commerce organises workshops for entrepreneurs, where 'local heroes' offer inspiration by recounting how they set up their businesses.	• Further steps will be taken towards establishing a national network of workshops in 2021. • If the pilot projects are successful, options for scaling up the programme will be explored with the parties involved.	Ministry of Economic Affairs and Climate Policy (ongoing)
An innovative, flexible industrial sector By 2021, Dutch industry will have the most flexible and digitally connected production network in Europe.	2 The Smart Industry Implementation Agenda serves to promote the digitalisation of Dutch industry.	• The Smart Industry Implementation Agenda (2018–2021) was launched in an effort to fast-track realisation of the Smart Industry programme targets. • There are now 46 field labs. • Five Regional Smart Industry Hubs have been set up to strengthen regional cooperation and have undergone further development in the last year. These hubs and field labs make up the regional ecosystem. The Netherlands has completed a pre-selection process for six European Digital Innovation Hubs, consisting of the five Smart Industry Hubs and one public proposal. • Increasingly, field labs are developing skills programmes in the form of courses, training sessions and meetings for students and employees.	Continued development: • Most of the fast-track projects from the implementation agenda have been started and will continue in 2021. National and international cooperation will be intensified, with centres, hubs and field labs continuing to develop their networks. The aim is to reach 6,000 SMEs. • One challenge facing the first field labs that are on the cusp of scaling up is to secure funding. • The Smart Industry Digital Access Expertise Platform will be developed further in 2021.	Ministry of Economic Affairs and Climate Policy (ongoing)

Domain & ambition	Actions outlined in the DDS 2018	Current status and results	What are we going to do?	Who (timeline)
		• 2020 saw the launch of the Smart Industry Digital Access Expertise Platform: a tool designed to help SMEs achieve higher productivity growth. The platform offers entrepreneurs greater insight into what Smart Industry can do for them and helps them make the investments needed to achieve this. • Cooperation between the Netherlands and Germany is going from strength to strength, aided by the launch of the German-Dutch AI4DT Field Lab. • An external agency, Dialogic, conducted a review of the Smart Industry programme. The results have been shared with the House of Representatives. The findings in the report will help to shape future policy.	• There will be more intensive collaboration between the Dutch Smart Industry Field Labs and the German labs 4.0 Network, and a focus on international standards for the secure exchange of data. Europe: • The proposals pre-selected by the Netherlands will be assessed in Europe. The process of selecting European Digital Innovation Hubs will be completed in 2021. Evaluation: • The current agenda for the Smart Industry programme ends in 2021. After 2021, policy will be shaped by the new government and with the cooperation partners.	
A transparent and accessible digital government Information, government services and new technologies are accessible to all.	3 An ambitious, broadly-oriented agenda for the digitalisation of public administration will be presented to the House of Representatives every summer.	• The Digital Government Agenda: NL DIGIbeter has been updated. • The proposed Digital Government Act, covering aspects such as secure login procedures for government authorities and semi-government authorities and the harmonisation of services, has been submitted to the Senate for assessment. • The Electronic Administrative Communications (Modernisation) Act has been presented to the House of Representatives. • The Senate has passed the Electronic Publications Act. • As part of the Innovation Budget, 24 projects were launched in 2020 that contribute to better digital government services or a more effective digital government. • The inter-administrative 'Start-up in Residence' programme saw the launch of several social challenges in 2020, including a special coronavirus challenge with issues for start-ups to address. • An inter-administrative programme plan to improve the key register system was drawn up in 2020 under the auspices of the Ministry of the Interior and Kingdom Relations. • Also in 2020, the Ministry of the Interior and Kingdom Relations collaborated with users to produce a Development Agenda for the step-by-step improvement and modernisation of the Key Register of Persons. • January 2021 marked the introduction of the Key Register Error Reporting Centre. • Digital identity: The Digital Identity vision letter was submitted to the House of Representatives in Q1 of 2021.	• There will be a further update to the Digital Government Agenda: NL DIGIbeter before the summer. This update may take a different form due to the upcoming change of government. • Implementation of the Digital Inclusion Action Plan will continue in 2021. We are continuing to make government services easier to use by focusing on digital accessibility of websites and apps and the use of clearer language in government communications. We are helping to improve digital literacy with courses and have introduced Digital Government Information Points to assist those who find it difficult to access government information in digital format. • Through the Digital Society Alliance, we are once again working with dozens of public, private and social partners to achieve an inclusive digital society for all. The Alliance has identified four target groups on which its activities will focus in the coming years: senior citizens, young workers stressed out by technology, 18-year-olds, and educators and children. • We are developing proposals to incorporate additional topics in tranche II of the Digital Government Act and subsequent implementing regulations. We aim to introduce the Act at the start of 2022. • The Electronic Publications Act is expected to enter into force on 1 July 2021.	Ministry of the Interior and Kingdom Relations (ongoing)

Domain & ambition	Actions outlined in the DDS 2018	Current status and results	What are we going to do?	Who (timeline)
			• We are continuing to utilise life events and customer journeys to make government services more accessible and personal. • The Innovation Budget will continue with at least 24 projects in 2021. • The 'Start-up in Residence' programme will continue with several challenges in 2021.	
Smart, sustainable mobility An integrated mobility system centred around users and user mobility. The Netherlands serves as the global testing ground for smart mobility.	4 The government will issue a letter on Smart Mobility developments in the public road system before the start of the summer period. A Digital Transport Strategy will be introduced before the end of 2018.	• A letter entitled 'Smart mobility on the move' was submitted to the House of Representatives on 30 November 2020, addressing the key developments and results in this area. • The European Data for Road Safety pilot project was successfully completed in late 2020 and scaled up to a permanent exchange. Under the chairmanship of the Netherlands, a data ecosystem has been set up with Member States and industry parties in which anonymous sensor data from hundreds of thousands of vehicles is shared with authorities and road operators to detect unsafe road situations and communicate them to road users. • The Experiments Act for the safe acquisition of knowledge of the new generation of self-driving vehicles has entered into force. • The Netherlands is the first country in the world to provide a digital overview of traffic signs. • The letter on the implementation status of the Digital Transport Strategy for Freight Transport and the Basic Data Infrastructure, setting out the latest developments in transport and logistics, was submitted to the House of Representatives on 24 November. • The Data Exchange Facility for Logistics (DEFlog) has been developed over the past two years and replaces the analogue processing by logistics service providers of road closures, road works and other disruptions to the road authorities' infrastructure in their schedules. Conversely, DEFlog eliminates the need for road authorities to consult major logistics service providers when organising traffic management. • Seven national Mobility as a Service (MaaS) pilots were launched in 2020 to give companies and authorities greater insight into the public's travel behaviour and to better manage mobility flows and policy objectives such as overcrowding, sustainability, availability and accessibility. In the context of COVID-19, public transport occupancy and congestion management is invaluable. • The letter on progress in sustainable mobility was submitted to the House of Representatives on 5 October 2020, providing an overview of the actions in this area.	Smart mobility: • Smart mobility has both a global and a local dimension. That is why the Ministry of Infrastructure and Water Management is joining forces with Dutch cities, regions and institutions as well as international market participants and authorities. The long-term agreements reached with local authorities on ongoing digitalisation in mobility will continue to be implemented in 2021, ensuring that data and data-intensive services help to promote various policy goals and an efficient government. • In 2021, the Logistics Alliance, the Logistics top sector and other authorities will continue to develop sustainable, digital and robust freight transport and logistics in metropolitan areas and corridors to the hinterland.	Ministry of Infrastructure and Water Management (ongoing)

Domain & ambition	Actions outlined in the DDS 2018	Current status and results	What are we going to do?	Who (timeline)
Better quality of life through digitalisation Digitalisation allows the Netherlands to improve quality of life, keep citizens healthy and independent as long as possible, and offer greater freedom of choice on individual care.	5 We are strengthening the innovative capacity of our care system and developing greater awareness, knowledge and competencies.	• On 25 February 2021, the Council of State's advisory division issued an advisory report on the Electronic Data Exchange in Health Care Bill (Wegiz) and the accompanying Explanatory Memorandum (MvT). • A response is currently being prepared in the form of a report to the King. In order to draw up a report to the King, the Bill and the Explanatory Memorandum must be amended. • In its final form, the Act will contain provisions that allow the imposition of requirements relating to aspects such as information security and privacy. It will also include provisions to enable certification of ICT products. • The AI Handbook for Health and Care has been finalised and published: https://www.datavoorgezondheid.nl/wegwijzer-ai-in-de-zorg • The Computer Emergency Response Team for Care (Z-CERT) was incorporated into the National Coverage System (LDS) at the start of this year and designated as the computer crisis team. This enables the National Cyber Security Centre (NCSC) to share as much threat information and potential actions on cybersecurity as possible with Z-CERT. • In the context of COVID-19, additional measures have been taken to increase digital resilience in the health care sector. Z-CERT has been incorporated in the NCSC's National Detection Network, as part of which threat information relating to hospitals is exchanged with Z-CERT.	• It is envisaged that the government will process the Electronic Data Exchange in Health Care Act before the May recess. • The Ministry of Health, Welfare and Sport is developing a risk-based approach to identify those health care institutions/sectors most at risk from cybercrime. This will help to increase the resilience of the Dutch health care sector. • The Ministry of Health, Welfare and Sport is currently exploring its public role in relation to cybersecurity in the health care sector. • The Ministry of Health, Welfare and Sport is conducting a review to ascertain whether certain organisations within the health care sector should be designated as vital providers. • The Ministry of Health, Welfare and Sport is working to raise cyber awareness in the health care sector through the ongoing Information-Secure Behaviour project. • The Ministry of Health, Welfare and Sport participates in the European Cybersecurity Health Group, part of the eHealth network, for the purpose of greater cooperation and information and knowledge exchange on cybersecurity in the European context. • As part of a programme to inform future actions, the Ministry of Health, Welfare and Sport is working with the field to increase the perceived value creation resulting from the use of AI in health care and exploring its public role in relation to AI in the health care sector.	Ministry of Health, Welfare and Sport (ongoing)
A safe and sustainable food supply Digitalisation contributes to the realisation of people, planet and profit targets, helping to improve food safety and reduce the environmental impact of agricultural activities with new revenue models. The Ministry of Agriculture, Nature and Food Quality vision 'Agriculture, water and nature, valuable and interconnected' serves as the Ministry's guide for the use of digital technology.	6 We are investing in digital technology-based knowledge, innovation and education programmes to promote agricultural sustainability.	Policy actions • In September 2020, the Minister of Agriculture, Nature and Food Quality sent a letter to the House of Representatives providing an update on innovation and precision agriculture and focusing on the use of various digital technologies. This letter also set out the National Agenda for Precision Farming. • At the end of 2020, the Ministry of Agriculture, Nature and Food Quality vision on digitalisation was published as an internal working document, setting out the various preconditions and foundations that must be in place in order for digitalisation to be used effectively as a tool for circular agriculture. • Investments by agricultural entrepreneurs in precision agriculture are often accompanied by an operating shortfall: it can take a long time to recoup such investments. This creates financial risks for agricultural businesses. Options are currently being explored for the introduction of an investment scheme, alongside other existing investment facilities, in the context of the Rural Development (POP3) programme.	Policy actions Further elaboration of the action programme based on the Ministry of Agriculture, Nature and Food Quality vision on digitalisation (currently an internal Ministry working document): an innovation programme and other joint actions relating to data sharing, data reliability and so on.	Ministry of Agriculture, Nature and Food Quality (Q3) (ongoing)

Domain & ambition	Actions outlined in the DDS 2018	Current status and results	What are we going to do?	Who (timeline)
		Knowledge and innovation • The Ministry of Agriculture, Nature and Food Quality encourages farmers to work with precision techniques and satellite data in order to reduce the use of products such as fertiliser and pesticides. In 2020, the National Living Lab for Precision Agriculture (NPPL) project was expanded to include six companies, one of which combines precision technology with fixed-path strip cropping systems. In addition, new precision agriculture applications have been added to the range, including precision irrigation, sowing and spraying, and various robotic applications (www.nationaleproeftuinprecisielandbouw.nl). • The Farm of the Future (BvdT) was officially opened in Lelystad on 25 June 2020. This facility serves as an innovation, test and demonstration facility for new circular agriculture concepts in outdoor cultivation. New cultivation systems and precision agriculture applications are developed in the 'Nursery'. Innovations are integrated, validated and demonstrated in the 'Model Company'. The Farm of the Future also functions as a discussion platform and knowledge centre for parties who want to move forward with circular agriculture in open cultivation. The Farm of the Future therefore serves as a link in the knowledge and innovation chain with regard to on-farm practice (www.farmofthefuture.nl). • Commissioned by the Ministry of Agriculture, Nature and Food Quality, Wageningen University & Research (WUR) has spent the past three years exploring the possibilities for blockchain applications in the agrifood sector. As part of this research, WUR examined over 30 blockchain use cases and blockchain platforms inside and outside the Netherlands. Prototype software will be built and tested for three use cases (FarmDataWallet, FloriChain and AGF-Chain) as part of the Blockchain for Agrifood programme. The findings in terms of best practices and challenges are based in part on experience gained with this software. The resulting report Blockchain voor agrifood: tussen droom en daad (Blockchain for agrifood: between dream and deed) is available for free download at https://doi.org/10.18174/535127 • Over the past year, a consortium from the agricultural sector led by WUR has worked on a feasibility study for the creation of data-sharing infrastructure in open cultivation. The data position of the farmer is key to designing an architecture in which data is shared in a safe and responsible manner. The aim is to give farmers as much control as possible over data generated by their business activities. A report of the findings is available at https://edepot.wur.nl/532701.	Knowledge and innovation • Development of a new project plan for the continuation of the National Living Lab for Precision Agriculture 2.0 in 2022 • Expansion of the Farm of the Future network: multiple locations throughout the Netherlands are set to join • Further implementation of the agrifood AI programme • Investment scheme for precision agriculture applications: the scheme will be launched during 2021 • Continuation of Precision Agriculture 4.0 with a focus on setting up data infrastructure • Launch of new PPPs within the KIA-LWV Smart Tech programme • Small Business Innovation Research (SBIR) Green Landscape Elements Monitor: The results of the SBIR will be used to initiate a tendering process in 2021	(Q2)

Domain & ambition	Actions outlined in the DDS 2018	Current status and results	What are we going to do?	Who (timeline)
		• In 2020, two consortia were commissioned by the Ministry of Agriculture, Nature and Food Quality, the Netherlands Enterprise Agency (RVO) and the Netherlands Space Office (NSO) to conduct a feasibility study and develop a prototype for a Green Landscape Elements Monitor. The purpose of this monitor is to recognise, register and monitor various types of green landscape elements in the countryside automatically. The monitor makes extensive use of various remote sensing data sources, combined with the development of AI algorithms. • Using Ministry of Agriculture, Nature and Food Quality funds, WUR set up two knowledge base programmes in 2020: one on Data Driven & High Tech, and the other on Digital Twins. Both programmes enable WUR researchers to further explore the potential of subjects in various areas. At the same time, digitalisation is also a theme addressed by the other knowledge base programmes. One example is research into remote sensing and machine learning for the benefit of the ecosystem within the knowledge base programme on Biodiversity in a Nature-Inclusive Society. • As part of the Agriculture, Water and Food Knowledge and Innovation Agenda (KIA-LWV), which was drawn up in the context of the mission-driven innovation policy, the Smart Tech programme explicitly focuses on the use of various digital technologies. The KIA-LWV call has resulted in a number of interesting PPPs, including 'Hands-free production in agrifood' and 'Innovative emission-free application techniques 4.0'. • The Ministry of Agriculture, Nature and Food Quality contributed towards the organisation of an agrifood programme within the AI Coalition. Green education • We are working with the Netherlands Organisation for Scientific Research (NWO) and Green Education (het Groene Onderwijs)on a call for practice-based research for the advancement of precision agriculture. Publication date September 2020.	Education • Green Pact Digitalisation fast-track programme to be set out in further detail • A new NWO-SIA call focusing on practice-based research to support the Farm of the Future will be issued this spring	(Q2)

Domain & ambition	Actions outlined in the DDS 2018	Current status and results	What are we going to do?	Who (timeline)
A flexible energy system The development of flexible energy networks, ensuring efficient use of the energy system and reducing the costs of the transition process.	7 We are working to make energy data more broadly available in a manner that allows consumers to retain control over their own information.	• The fourth Electricity Directive (2019/944/EU), which is yet to be implemented, contains key provisions on the digitalisation of the energy system. For example, one target is that by 2024 at least 80% of end users will be equipped with smart meter systems. In addition, the Directive includes provisions on (i) the creation of a 'data management model' and (ii) wider access to and unlocking of end-user energy data (e.g. meter and consumption data). The Climate Agreement (2019) also stipulates that the system for the exchange of energy data will be reviewed. • The Senate and the House of Representatives were informed of the decision to implement this Directive through the proposed Energy Bill in April 2019. This legislative proposal underwent a public consultation process from December 2020 to February 2021. • The proposal includes measures aimed at improving and rationalising the measurement chain, as well as improving the availability of high-quality and high-frequency data. There are also plans to review the system for data access and exchange, including (i) the definition of data processes, conditions and actors involved; (ii) rules on data register management; (iii) central and standardised access based on standards and agreements; and (iv) process, identification, security requirements, etc.	• The regular process steps for the preparation of a legislative proposal will be followed over the course of 2021. The Energy Bill is expected to be submitted to the House of Representatives in the second half of 2021. • The underlying regulations will also be prepared in parallel, including rules on measurement and data exchange.	Ministry of Economic Affairs and Climate Policy (ongoing)

2. Strengthening the foundations (basic conditions)

Themes & ambitions	Actions outlined in the DDS 2018v	Current status and results	What are we going to do?	Who (timeline)
Ground-breaking research and innovation				
A strong national foundation for knowledge, research and innovation The Netherlands benefits from digitalisation while helping to shape its further development. This involves maintaining a high standard of knowledge, which can only be achieved through collaboration between universities, universities of applied sciences, other knowledge institutions, businesses and government agencies.	8 As a key technology, ICT will feature prominently in the updated Mission-Driven Top Sector and Innovation Policy. 9 We are seeking to achieve optimal alignment between the National Science Agenda, 'The Digital society' by the Association of Universities in the Netherlands (VSNU), action lines set out by Team Dutch Digital Delta and individual ministerial knowledge agendas. 10 The government stimulates innovation by encouraging more intensive use of SBIR. 11 We are building public-private partnerships in the fields of artificial intelligence, big data, cybersecurity, blockchain, 5G and quantum computing.	• The Knowledge and Innovation Covenant (2020–2023) was introduced in late 2019 to merge various research agendas and various public and private funding sources. • Agreements on further alignment have been reached with the VSNU. • Through SBIR, we aim to establish a broader network of partners who use new technology to tackle social issues. By the start of 2020, highly detailed solutions had become available to issues such as flooding, maintenance of public spaces and access to archives. • 2020 also witnessed the completion of the second phase of the data landscape SBIR. In addition, the first phase of SBIR on new technology for lifelong development and digital inclusion has been initiated. As part of this first phase, 21 feasibility study proposals were accepted. Artificial Intelligence (AI) • The Strategic Action Plan for Artificial Intelligence (SAPAI) was launched on 8 October 2019. The implementation of SAPAI[1] is now fully under way. For more information, see the main text of the DDS update. • Since October 2019, the Dutch AI Coalition (PPP) has expanded from 70 to over 400 participating organisations in 2021. Working groups are focusing on 13 application areas and seven generic building blocks (human-centric AI, data sharing, human capital, research and innovation, start-ups and scale-ups, internationalisation and cross-sector learning).	• The ICT Top Team and the Ministry of Economic Affairs and Climate Policy are helping to establish long-term and cross-sectoral PPP programmes for research, innovation and talent for digital key technologies such as AI. A white paper on opportunities for 5G and beyond will be published in 2021. • SBIR for AI and public services; second phase. Five prototypes in the first phase. • SBIR for new technology was published in 2020. 21 feasibility study proposals accepted. • SBIR Ministry of the Interior and Kingdom Relations to be launched in 2021, first phase of new SBIR and second phase of ongoing SBIR for new technology for digital inclusion and lifelong development. AI • Five new AI labs for human-centric AI will be opened. • Support will be provided for two new regional AI knowledge and innovation clusters (hubs) (central Netherlands, Limburg). • The Dutch AI Coalition (NL AIC) is working with the NWO to set up a long-term strategic research programme (LTP) for AI. • A first thematic Dutch Research Agenda (NWA) call for AI is currently being prepared (Q2 2021)	Ministry of Economic Affairs and Climate Policy (ongoing) Ministry of Education, Culture and Science/ Ministry of Economic Affairs and Climate Policy (ongoing) All (ongoing) All (ongoing)

1 See also SAPAI for an overview of all actions. Parliamentary Papers II, 2019/2020, 26 643 and 32 761, no. 640

Themes & ambitions	Actions outlined in the DDS 2018v	Current status and results	What are we going to do?	Who (timeline)
Ground-breaking research and innovation				
		• The NWO awarded research projects in 2020 based on a call for human-centric AI. • New AI research labs have been set up, including for example an AI lab for culture and media. • AI kick-start funds have been used to support five regional AI knowledge and innovation clusters (hubs) and use cases in relation to data sharing for AI, including for energy. • Dutch organisations are well represented in all proposals approved in 2020 as part of an EU research call for large AI research networks (ICT 48 call). • Dutch organisations are taking part in a first Eureka call for industrial AI in 2020. • In March 2021, five universities, four university medical centres, the Centre for Work and Income (CWI) and a venture investor received a contribution under the Thematic Technology Transfer (TTT) scheme in order to fast-track the market launch of medical technology using AI. Big data • The Commit2Data research programme on big data as a key digital technology has reached a financial volume of over €60 million, of which €17 million is private funding. The programme comprises more than 60 research projects in which over 150 researchers are carrying out research in consortia with over 200 companies. Ten of the 60 research projects are currently receiving commercialisation guidance with the aim of putting the results into practice.	• AI training and education modules are becoming available, starting with health care. • Knowledge and tools in relation to data sharing for AI will be disseminated widely. • A second Eureka call will be launched for industrial AI. Big Data • Using the instruments from the commercialisation programme (customised support, network and expert input and funding), the support provided to the research groups will be expanded from the current ten to additional research projects.	Q3

Themes & ambitions	Actions outlined in the DDS 2018v	Current status and results	What are we going to do?	Who (timeline)
Ground-breaking research and innovation				
		Blockchain • The Dutch Blockchain Coalition is working on blockchain applications to tackle social issues, many of which are related to central government services. Seven use cases will be developed in collaboration with the relevant ministries, research institutions and companies. The highlights in 2020 were: • the creation of a consortium to deliver a Dutch Trust Network; a financial schemes checking tool for companies seeking to apply for coronavirus support; the roll-out of mijnwaardeoverdracht.nl for pensions; and the delivery of the 'uNLock' solution for the digital display of negative coronavirus test results. • New cases focusing on energy, mobility and sustainability were initiated, including at the EU level. Furthermore, a national blockchain course was launched and a national blockchain conference was organised. • At the international level, relations with Singapore and the EU were further intensified and preparations were started for a Partners for International Business (PIB) project with Germany. Cybersecurity • In 2020, five cybersecurity coordinators were engaged to lay the foundations for the new cooperation platform for cybersecurity knowledge and innovation. Steps have been taken in the area of research and innovation through NWA calls and a start has been made on two substantive pilot road maps in automated vulnerability research (AVR) and crypto communication. The 'Challenge the Cyber' competition is ongoing and several research programmes are under way to strengthen the 5G cybersecurity knowledge base in the Netherlands. • The 5G testing ground in Groningen has been expanded. The municipality of Eindhoven has signed the 5G covenant and will be participating in test frequency experiments.	Blockchain • The blockchain applications mentioned on the left will be developed further. The focus is shifting from experimenting and testing to actual, large-scale implementation within society. One priority is the development of a total solution to the issue of digital identity: the Dutch Self Sovereign Identity Framework (DSSIF). The scope of the coalition will be extended to include 'tokens' (2Tokens project). • The Ministry of the Interior and Kingdom Relations and the Association of Netherlands Municipalities (VNG) are working with municipalities to develop a Smart Society Ecosystem. The initiative will contribute to the acceleration and scaling of specific iconic projects in areas such as safety, security and digitalisation of the outdoor area. Smart Society icon projects will receive support in the process of attracting new partners, shaping public-private partnerships and acquiring the necessary funding. Specific attention is being devoted to national coordination of research and product development within ethical and legal frameworks. Cybersecurity • A platform office was set up in 2021 to support the cooperation platform for cybersecurity knowledge and innovation. A sum of €5.5 million has been earmarked for research, education and innovation in cybersecurity in 2021. The platform will be used to plan a number of thematic roadmaps in 2021 in collaboration with partners in the field. More parties will start to commit 'in kind' and 'in cash' to strengthening the Dutch cybersecurity knowledge base. • The Ministry of the Interior and Kingdom Relations and the VNG are working with municipalities to develop a Smart Society Ecosystem. The initiative will contribute to the acceleration and scaling of specific iconic projects in areas such as safety, security and digitalisation of the outdoor area. Smart Society icon projects will receive support in the process of attracting new partners, shaping public-private partnerships and acquiring the necessary funding. Specific attention is being devoted to the national coordination of research and product development within ethical and legal frameworks. A proposal will be developed for a public innovation hub to address these issues.	

Themes & ambitions	Actions outlined in the DDS 2018v	Current status and results	What are we going to do?	Who (timeline)
Ground-breaking research and innovation				
		Quantum computing • The national quantum technology agenda was drawn up in 2019 by the joint players within the broad national quantum ecosystem. This agenda will be implemented under the direction of the Quantum Delta Netherlands Foundation (QDNL) and covers three research programmes: quantum computer, quantum internet, quantum sensors and also a 'Quantum House' national liaison programme and a Start-up and knowledge transfer programme. • QDNL has its own internationalisation agenda. It works in close cooperation within the EU and with partners in the US and in Japan.	Quantum computing • The Ministry of Economic Affairs and Climate Policy is supporting the implementation of the NAQT with a 23.5 million euro kickstart fund. It will be announced by the end of April 2021 whether the proposal for the National Growth Fund for the large-scale implementation of the NAQT will be awarded. • A quantum internet action programme is currently being developed under the supervision of the European Commission. This EuroQCI programme will be launched during the course of 2021. NL plays a key role in this programme and will contribute toward securely encrypted messages via quantum key distribution and with terrestrial and space components for a pan-European quantum internet.	
	12 We are initiating an internationalisation agenda centred on the promotion of trade, international cooperation and strategic acquisition.	• Specific opportunities and focus areas have been identified by means of a marketanalysis. The outcomes have been assessed by sector organisations and other stakeholders.	• In 2020, Germany launched a pilot for the purpose of gaining experience with a strategic internationalisation approach. A proposal for a European Digital Innovation Hub is currently being developed.	
Innovation-friendly and future-proof legislation Legislation and regulations do not impose unnecessary restrictions on innovation.	13 A help desk will be created, enabling entrepreneurs to report any legislative impediments to digital innovation.	The help desk was opened in early 2019, and can be accessed through its website: https://www.ruimteinregels.nl/thema/digitale-economie.	The Ministry of Economic Affairs and Climate Policy will intensify its communication activities, raising awareness of the Digital Economy help desk among innovative SMEs. This will involve the use of channels such as the Digital Netherlands official website and Twitter account.	Ministry of Economic Affairs and Climate Policy (ongoing)
	14 The procedures for testing and experimentation at testing sites – including drone experiments – will be simplified.	The same rules apply to all drone pilots in the European Union since 31 December 2020, providing clarity and making it easier to fly a drone in the EU. The new regulations are designed to keep the skies safe and create greater scope for innovative applications using drones that support various activities.	A broad and open partnership is essential in order to exploit the innovative potential of drone technology to the full. An exploratory study will be initiated to this end.	

Themes & ambitions	Actions outlined in the DDS 2018v	Current status and results	What are we going to do?	Who (timeline)
Ground-breaking research and innovation				
	15 The Better regulations and services programme aims to eliminate concrete impediments to innovation and facilitate experimentation.	• This programme was part of the previous government's regulatory burden approach. • The programme comprised various individual ministerial action programmes, and outlined each ministry's concrete measures towards reducing the regulatory burden on businesses. • The final report was submitted to the House of Representatives at the end of December 2020.	Over the coming months, a new regulatory burden programme will be set up based on the agreements in the new coalition agreement.	Ministry of Economic Affairs and Climate Policy (ongoing)

Themes & ambitions	Actions outlined in the DDS 2018	Current status and results	What are we going to do?	Who (timeline)
Career alternatives, new skills and lifelong learning				
The educational curriculum is up to date Young people have good basic ICT skills and information skills, and are media savvy.	16 The primary and secondary education curricula devote attention to digital literacy and practical skills, helping pupils to prepare more effectively for the future.	• The primary and secondary education curricula are currently being updated, with a strong emphasis on digital literacy as a new learning area. To this end, proposals have been developed over the past two years that form a basis for new educational goals. • An independent committee was recently set up for the purpose of adapting the primary education curriculum. It has now been given the task of advising on the technical and substantive suitability of Curriculum.nu's proposals and the assignments granted to the Netherlands Institute for Curriculum Development (SLO). Based on the proposals submitted by the development teams and the interim recommendations of the curriculum committee, the SLO will go on to develop attainment targets and learning outcomes in collaboration with subject matter experts and teachers. The quality and feasibility of the draft attainment targets will be tested in pilot schools over the course of two academic years and subsequently enshrined in law.	• A proposal has been submitted to the National Growth Fund to stimulate the transition to innovative and future-oriented education in primary and secondary schools, colleges and universities. The proposal is made up of three components: (1) strengthening innovation and the functioning of the market for educational resources, (2) improving the knowledge and support infrastructure and (3) a leap in practice.	Ministry of Education, Culture and Science (Q2)

Themes & ambitions	Actions outlined in the DDS 2018	Current status and results	What are we going to do?	Who (timeline)
Career alternatives, new skills and lifelong learning				
	17 The senior secondary vocational and higher education sectors are working on developing digital skills and better integration into the labour market.	Higher education: • In the Education Innovation with ICT acceleration plan, universities of applied sciences and research universities have set themselves the goal of better preparing graduates for the labour market by equipping them with digital skills. • Cooperation between employers, education and research is central to the labour market integration element of the plan. As part of this element, the parties involved look at how the needs of the labour market can be translated into education for current and new target groups. New target groups include people who are retraining and professionals who want to stay up to date. • Methods to enable educational institutions to draw up future-proof competence profiles that are in line with digital developments on the labour market will be explored as well. • The facilitating and professionalising teachers element of the Education Innovation with ICT acceleration plan involves working on an integrated approach to support the professionalisation of teachers. This will involve pooling expertise and delivering a range of products to support teachers in the intelligent digitalisation of education. • In addition, a set of 'building blocks for professionalisation' are being developed to enable institutions to set up their own effective professionalisation programmes in the field of education innovation with ICT. In addition, they are developing an integrated approach to the professionalisation of teachers, since the acquisition of new skills for effective teaching needs to be supported, recognised and valued by the organisation as a whole. Senior secondary vocational education • Steps are being taken to promote digital citizenship skills as part of the Strategic Digitalisation Agenda for senior secondary vocational education (MBO), which is similar to the agenda for higher education. Many educational institutions are making focused efforts to strengthen their ties with the business sector.		

Themes & ambitions	Actions outlined in the DDS 2018	Current status and results	What are we going to do?	Who (timeline)
Career alternatives, new skills and lifelong learning				
Adequate level of basic digital skills Everyone can participate in the digital society.	18 Efforts are being made to develop training initiatives for those with limited digital skills. The government supports municipalities, libraries and civic initiatives providing additional training to those with limited digital skills.	• A total of 53 Digital Government Information Points were opened in 2020.	• Implementation of the digital inclusion action plan will continue in 2021.	Ministry of the Interior and Kingdom Relations (ongoing)
	19 Government agencies are more focused on providing clearly understandable and user-friendly digital services.	• The Digital Accessibility Decree entered into force on 23 September 2020, making it compulsory for government websites to also be accessible to people with disabilities. • In 2020, the Crystal Clear Brigade provided additional momentum for the use of clear language in government communications. As many as 20,000 texts (websites, letters, emails) have been converted into clear language. • The Doe je digiding! (Do your digital thing) educational programme was rolled out at the national level in 2020 and will continue in 2021. This lesson pack is aimed at pre-vocational secondary education (VMBO)/senior secondary vocational education (MBO) and prepares young people who are about to turn 18. The programme is a collaboration with the Digital Society Alliance. • The click-and-tick Veilig online (Safe online) module was launched in 2020 to promote safe use of the internet. • The Tel mee met Taal (Words count) programme focuses on improving the digital skills of functionally illiterate citizens. This programme will continue until 2024.	• A further 67 Digital Government Information Points are set to open in 2021. However, the opening of these facilities is dependent on developments in the COVID-19 crisis. • In 2021, the Digital Society Alliance will focus its activities on the following four target groups: senior citizens, (young) workers stressed out by technology, 18-year-olds, and educators and children. Digital support via the Digi helpline (0800-1508) will be further expanded and the partners will be consulted to explore long-term solutions to ensure that the most vulnerable in our society also have digital access through the #allemaaldigitaal campaign.	Ministry of the Interior and Kingdom Relations (ongoing)
	20 Daarnaast worden experimenten en proeftuinen opgezet om in de praktijk te ervaren op welke manier het beste op de behoefte van mensen kan worden ingespeeld.	• Binnen de Alliantie Digitaal Samenleven werken publieke, private en maatschappelijke organisaties samen aan een inclusie digitale samenleving. De actie #allemaaldigitaal verzamelt laptops en tablets van overheid en bedrijven. 5700 digitale apparaten zijn uitgedeeld aan mensen die door de COVID-19 maatregelen uitgesloten waren om digitaal te kunnen werken of minder sociaal contact hadden. Dit is naast de laptops die het ministerie van OCW heeft ingekocht voor schoolkinderen. De Digihulplijn (0800-1508) is gelanceerd om mensen te helpen bij het (veilige) gebruik van een laptop of tablet.		Ministry of the Interior and Kingdom Relations (ongoing)

Themes & ambitions	Actions outlined in the DDS 2018	Current status and results	What are we going to do?	Who (timeline)
Career alternatives, new skills and lifelong learning				
A learning workforce People have the opportunity to develop their knowledge and skills continually and to keep functioning effectively in a changing environment without any loss of job satisfaction.	21 The government announced an action plan outlining ground-breaking lifelong learning measures before the start of the summer period in 2018.	The action plan drawn up in September 2018 continued in 2020. Broad efforts are being made to stimulate a positive culture of learning in collaboration with social partners, educational institutions and parties from the professional field. Public individual learning accounts (the STAP budget) and a digital overview of training options will offer individuals greater control over their own development. A subsidy scheme has been introduced to support a strong learning culture in SMEs. In addition, the regional support structure will be strengthened further through training and employment help desks and other initiatives. Plans for a more flexible range of adult education programmes – e.g. in the form of tailored training programmes reflecting individual needs – will also be presented.	The LLL action plan will be elaborated into six specific action lines for the 2019–2022 period: 1 Strengthening regional support: three pilot projects have been launched in various Employee Insurance Agency (UWV) regions (three-year period) 2 Promoting a culture of learning in the SME sector: The SLIM subsidy scheme was introduced in 2020, linked to the €48 million in funds earmarked in the Wiersma motion (three-year period) 3 Flexibilisation of the Secondary Vocational Education sector (Ministry of Education, Culture and Science action line, four-year period) 4 Digital portal: currently under exploration (Ministry of Education, Culture and Science action line) 5 a) Encouraging private learning accounts- Experiment in collaboration with James b) Public individual learning and development budget has been 'designed' (STAP scheme) and implemented by the UWV, with a start date in 2022 6 Communication in support of a culture of learning • An evaluation framework will be developed to assess the experiments and pilot projects in the LLL action plan. • This will involve collaboration with the MKB!dee initiative (Ministry of Economic Affairs and Climate Policy) in the approval of applications.	Ministry of Social Affairs and Employment (ongoing) Ministry of Social Affairs and Employment/ Ministry of Economic Affairs and Climate Policy (Q4)

Themes & ambitions	Actions outlined in the DDS 2018	Current status and results	What are we going to do?	Who (timeline)
Career alternatives, new skills and lifelong learning				
Sufficient ICT professionals Businesses have access to sufficient and sufficiently qualified staff.	22 The Technology Pact will be continued and the Human Capital Agenda (HCA) ICT will be rolled out in order to improve the availability of qualified ICT staff.	The HCA ICT approach was adjusted at the start of 2019, and is now more focused on collaboration between education and business sector parties. NL Digital will be contributing in kind to the new agenda from 2019 onwards. The focus will be on the following initiatives: • Regional public-private partnerships between the business community and vocational education institutions. This includes the creation of four new partnerships with the aid of subsidies from the Regional Investment Fund (RIF). • Incorporating new technologies (such as blockchain and AI) into higher education curricula. • Pass IT on (higher education) will initiate a collaboration with Jet-Net/TechnetPas (realised in 2020). • In addition to the current policy, initial steps were taken last year in the development of a scaling-up plan for successful initiatives for retraining and refresher courses in ICT. The aim is to get many more people working in ICT in the coming years.	The roll-out of the HCA ICT will continue in 2021. • The enhanced cooperation with the Talent for Technology Platform has proven successful. Many more regional partnerships have been established in the areas of ICT and digitalisation. • Collaboration takes place with the other top sectors because digitalisation is playing an increasingly large role in all domains and sectors. • Due to the COVID-19 crisis, options are being explored for the organisation of guest lectures in schools. Alternative methods such as webinars are also being considered.	Ministry of Economic Affairs and Climate Policy (ongoing)
	23 The 'Strengthening ICT Human Resource Management (HR) in the civil service' action plan was rolled out over the course of 2018 as part of the effort to improve the recruitment and retention of government ICT staff.	• Launch of the inter-ministerial 'Strengthening Government ICT HR in the civil service' programme. Initiatives established as a part of this programme include I-trainee, a programme comprising a data science track, targeted ICT recruitment campaigns and an initiative whereby ICT candidates' CVs are shared (subject to permission by the candidate) between the various government bodies. • The continuity and essential reform of digital services provided by central government are under threat due to a lack of knowledge sharing in the field of information technology and a low influx of IT talent. The 'Strengthening ICT HR in the civil service' programme was launched in 2018 with the aim of bringing in more IT expertise and boosting IT knowledge. This programme focuses, among other things, on recruitment from outside the sector and the retraining of incumbent civil servants for IT roles. A Government I-traineeship has also been introduced for recently or nearly qualified IT talent, with a focus on data science and cybersecurity.	• RADIO was launched in late 2018 to increase the knowledge and skills of civil servants in relation to digitalisation. This initiative is continuing to grow. • As a follow-up to the classroom-based basic course, RADIO developed various e-learning modules, webinars and podcasts in 2020. The RADIO offering will be expanded further in 2021.	Ministry of the Interior and Kingdom Relations (ongoing)

Themes & ambitions	Actions outlined in the DDS 2018	Current status and results	What are we going to do?	Who (timeline)
Career alternatives, new skills and lifelong learning				
		• 2020 saw the launch of the 'I-Partnership': a partnership between central government and the higher education sector on social digitalisation issues. Efforts are being made to attract young IT talent and knowledge through activities such as field labs, input from PhD candidates and the organisation of relevant minors. Subsequently, this knowledge will be shared by the Governmental Academy for Digitalisation and Computerisation of the Government (RADIO).		
Clearer information on working via platforms More effective support for people seeking a suitable employment relationship and clearer frameworks for employers.	24 A government investigation into the position of platform workers has been sent to the House of Representatives with an official response.	• The Committee on the Regulation of Work published its final report on 23 January 2020. In its response to the recommendation made by the Committee on the Regulation of Work, the government has indicated that it will start to develop a presumption of law that can provide platform workers with practical support. • The Social and Economic Council of the Netherlands (SER) was commissioned to conduct an exploratory study of the platform economy. Among other aspects, the study focused on the position of platform workers, the position and nature of platform companies and the enforcement of false self-employment regulations. The SER's exploratory study was published in October 2020.	• The government is currently working on a response to the SER's exploratory study of October 2020.	Ministry of Social Affairs and Employment
	25 The coalition agreement sets out various measures aimed at providing greater clarity for self-employed contractors and clients, while preventing false self-employment.	• Various measures have been taken to protect the lower segment of the workforce and facilitate businesses at the upper end of the market. One such measure was the clarification of the legal subordination criterion on 1 January 2019. As regards the client statement, a web module pilot was commenced on 11 January 2021.	• The web module pilot will continue. In the summer of 2021, a review will be conducted to determine whether the web module is a helpful tool and a decision will be made on its potential permanent use.	Ministry of Social Affairs and Employment (ongoing)

Themes & ambitions	Actions outlined in the DDS 2018	Current status and results	What are we going to do?	Who (timeline)
A dynamic digital economy				
Competitive markets Markets remain competitive, ensuring a fair and competitive digital economy.	26 The viability of current competition regulations will be assessed, and various measures towards ensuring market competitiveness will be analysed.	Within Europe, the Netherlands has advocated for regulations to govern large platforms with a gatekeeper function (see Parliamentary Paper 35 134, no. 13). On 15 December, the European Commission published a proposal for the Digital Markets Act (DMA) featuring many of the points set out in the Dutch policy commitment.	The so-called BNC file containing the Dutch position regarding the DMA was submitted to the House of Representatives in February 2021 (Parliamentary Paper 22 112, no. 3049). The Netherlands will continue to promote this commitment during negotiations in 2021.	Ministry of Economic Affairs and Climate Policy (Q2 2020 – Q1 2021)
Fair relationships Platform companies should treat the providers active on their platforms fairly.	27 The relationship between platforms and entrepreneurs – both within the Netherlands and Europe – should be based on a transparent approach to conditions, dispute resolution and search results.	On 12 July 2020, the European 'Platform-to-Business' (P2B) Regulation entered into force. The regulation includes transparency requirements and stipulations on the resolution of disputes between platforms and their business users. Platforms have until 12 July 2020 to comply with the provisions of the regulation.	The government is developing a bill that will give the Netherlands Authority for Consumers and Markets (ACM) the power to enforce the P2B regulation. This bill will undergo an internet-based consultation process in Q2 of 2021.	Ministry of Economic Affairs and Climate Policy
	28 The government currently discusses with municipalities and platforms a uniform registration system for home-owners renting out their houses to tourists through platforms. Such a system will allow for more effective and efficient enforcement by municipal authorities.	• A proposed bill enables municipalities – subject to certain preconditions – to introduce registration requirements for private citizens offering their home for rental through platforms. These requirements may be supplemented with a duty to report each rental and/or a licensing requirement for specific areas. Furthermore, parties renting out their homes to tourists would also be required to specify their registration number in advertisements. The municipalities are currently discussing the options for further development and funding of a uniform registration system. • The bill came into force on 1 January 2021.	Currently no ongoing activities	Ministry of the Interior and Kingdom Relations (Q1-4)

Themes & ambitions	Actions outlined in the DDS 2018	Current status and results	What are we going to do?	Who (timeline)
A dynamic digital economy				

A flourishing data economy
In the Netherlands, data is most effectively shared within and between individual industry sectors.
	29 We are currently exploring the potential for a set of open cross-sectoral agreements on responsible and voluntary data sharing between businesses.	• In view of its collaboration with international parties, the datadeelcoalitie has changed its name to the Data Sharing Coalition.
		• A total of 38 parties have formally joined the consortium to date.
		• The first five use cases are currently being developed and will be used to create a blueprint for the trust framework. These use cases are:
		  • Creating green mortgages using energy data.
		  • Offering insurance for specific cargoes.
		  • Facilitating data benchmarking for branches of industry.
		  • Facilitating the sharing of Agricultural IoT data with a wide range of parties.
		  • Creating demand-driven facilities/cleaning services based on sensor data from buildings.
			The coalition will complete a blueprint for the trust scheme in Q3, marking the starting point for the next phase.	Ministry of Economic Affairs and Climate Policy (Q3)

	30 Government data will be made more easily accessible. This will involve a focus on: • ensuring real-time access to dynamic government data • a substantial increase in the amount of highly valuable data sets, easier and more cost-effective accessibility and support during the application process.	• The NL DIGITAL - Government Data Agenda incorporates concrete measures aimed at getting our data in order, ensuring data accessibility, data-driven problem resolution and working methods, responsible data use and legislation and regulations. Most of the actions in the 2020 agenda have been implemented: • The NL Digital Government Data Agenda was updated and submitted to the House of Representatives in April 2020. • A progress report on the Government Data Agenda was submitted to the House of Representatives in spring 2020. Key themes include public values, data in order, data accessibility and sharing, and data-driven working methods within government. A specific focus is also placed on how data can help to tackle the social challenges presented by COVID-19.	• In 2021, a progress report on the Government Data Agenda will be submitted to the House of Representatives. An Inter-administrative Government Data Strategy will also be developed and presented to the House of Representatives. This data strategy will establish guidelines for the use of data to address social challenges.	Ministry of the Interior and Kingdom Relations (ongoing)

Themes & ambitions	Actions outlined in the DDS 2018	Current status and results	What are we going to do?	Who (timeline)
Strengthening the resilience of citizens and businesses				
A safe digital society People and businesses can safely use digital technologies.	31 The Dutch Cyber Security Agenda (NCSA) focuses on seven lines of action.	Before the summer, the annual NCSA progress report will be published alongside the 2021 Dutch Cybersecurity Monitor. This report will update the House of Representative on the inter-ministerial progress made in the implementation of the seven lines of action. As the NCSA has come to an end, the progress report will also include an assessment of the NCSA by the Research and Documentation Centre (WODC).	Within the frameworks of the NCSA, the policy goals set out in the letter to the House of Representatives with the title 'Outcomes of the exploratory study on statutory powers, digital resilience and policy responses to WODC reports' will be pursued until the start of a new government term.	Ministry of Justice and Security (ongoing)
	32 The purpose of the Digital Trust Centre (DTC) is to make businesses that are deemed non-critical resilient against cyber threats (target group of 1.8 million businesses). The two key tasks of the DTC are to 1) foster partnerships within this target group and 2) share information and advice.	By the end of 2020, the DTC had established 31 partnerships (target of 30). General threat information and advice are shared via a website, social media and a digital platform, and practical tools have been developed for business owners. The website had a total of 184,000 visitors at year end 2020 (target of 100,000). A number of interactive tools were also developed in 2020, such as the Risk Category Model (in collaboration with the Centre for Crime Prevention and Safety [CCV]) as well as a guide for cybersecurity initiatives. In addition, the basic scanning tool for secure commerce has undergone further development to make it more user-friendly. A strategic communication plan has been drawn up to boost the reach/impact of the DTC and will be developed into a communication plan in 2021. Alongside the activities aimed at sharing general threat information and advice, the first steps were taken in late 2020 to set up an information service for sharing specific threat information with individual companies. At the end of 2020, we also started drafting a legislative proposal to establish a legal basis for such a service. The DTC is expected to obtain OKTT status (as an organisation objectively tasked with providing other organisations or the public with information on threats and incidents) in the first quarter or early second quarter of 2021.	Targets for 2021 are: • OKTT status for the DTC • Launch of DTC Information Service • 37 partnerships • online community with 250 participants • 4000 completed basic scans	Ministry of Economic Affairs and Climate Policy (ongoing)

Themes & ambitions	Actions outlined in the DDS 2018	Current status and results	What are we going to do?	Who (timeline)
Strengthening the resilience of citizens and businesses				
	33 The Netherlands will advocate a rapid adoption of the Cybersecurity Act (CSA) in Brussels. As regards the short term, the government advocates the adoption of mandatory certification for specific product groups. The role of security by design will also be important in this regard. In the longer term, these measures should be gradually supplemented with a mandatory certification system or CE marking requirements for all products with internet connectivity.	The CSA has entered into force and the legislative proposal for the Cybersecurity Regulation Implementation Act has been submitted to the Council of State for advice. In the EU, the first certification schemes are being developed, including for cloud services. The Netherlands actively contributes to the development of schemes, for instance through the public-private Online Trust Coalition. With regard to minimum legal requirements for smart devices under the CE system (through the Radio Equipment Directive, RED), the European Commission is expected to make the necessary decisions in the summer followed by a transition period and the development of the necessary technical standards. Devices that subsequently fail to meet the requirements can be banned from the market and recalled by Radiocommunications Agency Netherlands. The Netherlands actively contributes to these technical standards through the European CEN/CENELEC network for IoT standards (with the Netherlands acting as chair and NEN administrator). In addition, the House of Representatives was updated on all measures in the Digital Hardware and Software Security Roadmap on 14 December 2020 (Parliamentary Paper 26 643, no. 735).	The Netherlands will continue to advocate statutory digital security requirements to keep unsafe smart devices off the European market and, in addition to the requirements set out in the Radio Equipment Directive, will contribute to the development of horizontal regulation for the cybersecurity of ICT products. The legislative proposal for the Cybersecurity Regulation Implementation Act designates Radiocommunications Agency Netherlands as the national authority for the CSA. The Netherlands remains committed to compulsory cybersecurity certification in the EU in accordance with the Paternotte motion.	Ministry of Economic Affairs and Climate Policy (ongoing)
	34 The Ministry of Defence updated its Cyber Strategy in 2018.	The Ministry of Defence published its Defence Cyber Strategy: Investing in the Netherlands' digital capability in 2018. The strategy was developed through a number of lines of action in 2020.	Realisation of these lines of action will take several years due to the complexity of the relevant environments and issues. The Defence Vision 2035 also illustrates what is required to respond to threats and problems in the digital domain in the future. Knowledge, technological development and innovation form the basis for the modernisation of the armed forces.	Ministry of Defence (ongoing)

Themes & ambitions	Actions outlined in the DDS 2018	Current status and results	What are we going to do?	Who (timeline)
Strengthening the resilience of citizens and businesses				
	35 The Broad Digital Government Agenda: NL DIGIbeter will include a cohesive package of measures aimed at improving information security and cybersecurity in the realm of public administration.	• In 2020, experience was gained with the Cybersecurity Procurement Requirements Wizard in the form of pilot projects. Following a review, the procurement requirements will be implemented on a broader scale. • Implementation of the Government Information Security Baseline (BIO) continued in 2020, with support from parties including the Ministry of the Interior and Kingdom Relations and the VNG. This support will continue in 2021. • Another government-wide cyber exercise was organised in 2020, but this time entirely digitally. • The National Coverage System (LDS) has been incorporated into the NCSA. The government is taking part in and contributing towards the formation of a Computer Emergency Response Team (CERT) and the integration of this team with the NCSC.	• Another government-wide cyber exercise will be organised in 2021, entirely digitally. • In order to boost the adoption of security standards (HTTPS/HSTS), additional efforts will be made in 2021 to improve awareness among parties that are lagging behind. This will be achieved through channels such as the Ministry of the Interior and Kingdom Relations and the Standardisation Forum. In 2022, implementation of these standards will become a legal requirement. • At municipal level, work is continuing on the Municipal Digital Security Agenda. This agenda deals with both the security of the municipal organisation and administrative responsibility in the event of locally occurring cyber incidents. The provinces will also be encouraged to take part in 2021.	Ministry of the Interior and Kingdom Relations (ongoing)
Protection of and control over personal details Citizens can rest assured that their online privacy is adequately protected, and have control over their own personal details.	36 The government will strive to develop and implement an ambitious European e-privacy regulation.	In February, the Council adopted a common position. The Portuguese Presidency can now negotiate the final text with the EP.	The Netherlands remains committed to the rapid introduction of the e-privacy regulation.	Ministry of Economic Affairs and Climate Policy
	37 As announced in the coalition agreement, the government will focus on safeguarding privacy between individual citizens. This autumn, the government will send a letter to the House of Representatives outlining the government's vision on how to improve privacy among citizens and the measures the government intends to take to this end.	• The announced letter, Protecting horizontal privacy, was submitted to the House of Representatives on 7 June 2019 (Parliamentary Paper 34 926, no. 8). The letter has been broadened in scope to outline the government's vision on horizontal privacy, and focuses on the relationship between citizens and commercial entities. • In February 2021, the government informed the House of Representatives of the progress made in the implementation of the horizontal privacy agenda. It also shared a phased plan to achieve a better system for the removal of illegal content from the Internet.	1 The government is continuing to work on: Increasing privacy awareness. One of the ways it is doing this is by providing additional information by the Dutch Data Protection Authority (AP). 2 Expanding the scope for action. A review will be carried out into the financial resources for financing collective actions, with a special focus on a litigation fund. 3 Strengthening standards. Privacy standards should offer an adequate level of protection. A number of initiatives have been introduced in this area, including the criminalisation of revenge porn and measures against the filming of traffic casualties and other persons in need. In addition, efforts will continue in 2021 to enshrine some of the data analysis guidelines issued by the government in law. The now updated guidelines will be shared with the House of Representatives in Q2 of 2021.	Ministry of Justice and Security (Q2) (Q2-3)

Themes & ambitions	Actions outlined in the DDS 2018	Current status and results	What are we going to do?	Who (timeline)
Strengthening the resilience of citizens and businesses				
	38 Clear frameworks for personal data management will be formulated before the end of the current government term as a part of the 'Control over data' programme. The first draft version of the Uniform Set of Requirements for personal data management will be published in late 2018.	The House of Representatives received the policy letter on control over data in 2019. This letter sets out three different lines of action: 1 Data sharing with private parties; 2 One-time data provision; 3 Correction and inspection of data. The letter announces the introduction of clear frameworks (to replace the previous uniform set of requirements) for data sharing with a statutory basis in the Digital Government Act. Control over data An interdepartmental Steering Group on Control over data was set up in 2020. Under the supervision of this steering group, a legal task force was formed that, by the end of 2020, was developing proposals for further statutory regulation of the sharing of data from government registries with third party private service providers. These proposals will ultimately be implemented in the Digital Government Act	Control over data Work will continue on the Control over data programme in 2021.	Ministry of the Interior and Kingdom Relations (Q1–4)
Effective consumer protection during internet purchases Consumers in today's digital world can take informed decisions when purchasing products online.	39 Consumers need to know which counterparty to turn to in the event of any questions or problems. This means consumers must be informed about the identity of the contracting party and should know whether the supplier is acting as a business or consumer. The government will consult with consumer rights organisations, manufacturers and platforms to identify the most effective approach.	Completed – see comments in the letter to the House of Representatives (Parliamentary Paper 27 879, no. 76).	The letter to the House of Representatives stated that the document would be reviewed with the relevant platforms in one year's time to ensure that the examples were up to date and added value.	Ministry of Economic Affairs and Climate Policy

Themes & ambitions	Actions outlined in the DDS 2018	Current status and results	What are we going to do?	Who (timeline)
Strengthening the resilience of citizens and businesses				
	40 The government aims to ensure that consumers have better access to information on their basic rights when making purchases through an online platform, and will be exploring the options for more effective communication with various parties.	Completed – see comments in the letter to the House of Representatives (Parliamentary Paper 27 879, no. 76). As part of the Recht hebben, recht halen ('Have the right, assert your rights') campaign, the government has been alerting consumers to the risks of direct imports from third countries through short, clear videos on social media since November 2019. The videos focus on both the risk of inadequate consumer protection and product safety risks. The campaign is the result of a joint effort by the government, civil society organisations and regulators. A new component, laat je niet inpakken ('don't be taken in'), was added to the campaign in December 2020 to address the consequences of dropshipping.	• On 15 December 2020, the European Commission presented its proposal for a 'Digital Services Act', which reflects the Dutch policy commitment. • The government is considering the next steps to be taken in the wake of the campaign. • The government submitted the so-called BNC file to the House of Representatives in early 2021.	
	41 Directive (EU) 2019/2161 on better enforcement and modernisation of Union consumer protection rules was adopted on 27 November 2019. The Directive establishes more stringent information requirements and obliges platforms to provide greater transparency on the identity of their suppliers.	In progress	• Implementation of this part of the New Deal for Consumers has commenced. The internet consultation took place from 23 October 2020 to 22 November 2020. Implementation must be completed by 28 November 2021. The provisions must be applied with effect from 28 May 2022. • The bill is scheduled for submission to the House of Representatives in July or August 2021.	Ministry of Economic Affairs and Climate Policy/Ministry of Justice and Security
	42 The government will investigate the concrete problems encountered by consumers when purchasing products that are (or could be) part of the Internet of Things. As a part of this effort, the government will also assess whether the Internet of Things (IoT) is being effectively monitored and problems can be addressed adequately.	In progress	• The government will continue the conversation with the regulators to jointly seek synergy and keep the focus on the digital security of IoT devices.	

Themes & ambitions	Actions outlined in the DDS 2018	Current status and results	What are we going to do?	Who (timeline)
Strengthening the resilience of citizens and businesses				
	43 The government's investigation into issues encountered while making purchases on digital platforms will be submitted to the House of Representatives along with a response in the second half of 2018.	Implemented (Parliamentary Paper 27 879, no. 73)		
	44 The government has commissioned a study on consumer policy in the digital economy.	Implemented (Parliamentary Paper 35 134, no. 14)		
	45 The government is in the process of implementing the Directives on the sale of goods and the supply of digital content (OJEU 2019, L 136). This bill introduces new rules for digital content (e.g. apps), digital services (e.g. streaming) and for goods with a digital element (e.g. smart TVs).		• The Implementation Bill for the Directives on the sale of goods and supply of digital content was submitted to the House of Representatives on 16 February 2021 (Parliamentary Paper 35 734, no. 1). • The directives must be transposed into national law by 1 July 2021 and applied by 1 January 2022.	Ministry of Justice and Security/Ministry of Economic Affairs and Climate Policy
	46 At the request of Member of Parliament Moorlag (Parliamentary Paper 27 879, no. 81), the government will encourage the business community to adopt self-regulation in the field of undesirable online influence on decision-making through the use of data and algorithms.	In progress	The government will hold talks with the business community, sector organisations and consumer organisations, and provide feedback to the House of Representatives.	

Themes & ambitions	Actions outlined in the DDS 2018	Current status and results	What are we going to do?	Who (timeline)
Basic rights and ethics in the digital age				
Confidence in the digital future The safeguarding of public values and human rights is factored into the development and use of data and algorithms.	47 The government has called on the Scientific Council for Government Policy (WRR) to issue a recommendation on the threats and opportunities of artificial intelligence.	The WRR is preparing the advisory report requested by the government. This research is ongoing.	The WRR is preparing the advisory report requested by the government. This research is ongoing.	Ministry of Economic Affairs and Climate Policy (ongoing)
	48 A working group will be established to explore the ethical issues surrounding digitalisation and propose concrete follow-up actions where necessary.	The Netherlands has been actively involved in negotiations on ethical guidelines for AI in UNESCO in 2020. The document provides normative guidelines for AI, based on shared fundamental values.	Two more major UNESCO meetings are scheduled to take place in 2021, at which the recommendation on these guidelines will be discussed in greater detail.	Ministry of the Interior and Kingdom Relations (Q3/Q4)
	49 The Minister of Legal Protection will issue a letter on the application and use of algorithms and artificial intelligence in the administration of justice in the autumn of 2018.	• In November 2020, a joint government response (Ministry of Justice and Security/Ministry of the Interior and Kingdom Relations/Ministry of Economic Affairs and Climate Policy) to three studies that touch on undesirable effects of – and the legal framework surrounding – algorithms was submitted to the House of Representatives. The studies in question were: 'Modernisation of procedural law in light of big data research', an exploratory study on 'Legal aspects of decision-making algorithms' and the study 'Unforeseen effects of self-learning algorithms'.	• A joint progress report is currently being drafted by the Ministry of the Interior and Kingdom Relations, the Ministry of Justice and Security and the Ministry of Economic Affairs and Climate Policy on the following letters: 1) AI, public values and human rights, 2) supervision of government algorithms and 3) official project group + policy and research agenda on standardisation and supervision of algorithms. • The official project group set up by the government for the standardisation and supervision of algorithms seeks to provide an overview of the various processes and outstanding policy issues relating to algorithms and AI. • The government will also consider the desirability of measures such as enshrining the guidelines for data analysis by the government in law to a degree, assessing European proposals on legislation concerning artificial intelligence and the process relating to the Ad Hoc Committee on Artificial Intelligence (CAHAI) of the Council of Europe.	Ministry of Justice and Security/Ministry of the Interior and Kingdom Relations (Q3/Q4)

Themes & ambitions	Actions outlined in the DDS 2018	Current status and results	What are we going to do?	Who (timeline)
Basic rights and ethics in the digital age				
Cooperation and dialogue There is a need for broad civic dialogue on new ethical issues.	50 The government organises and encourages dialogue on technological developments.	In 2020, a focus will once again be placed on the provision of information to citizens: • A dilemma game is currently being developed under the name Tech Twijfels (Tech Misgivings). The purpose of this game is to get secondary school students thinking about the opportunities and risks presented by new technologies in terms of human rights. The game is expected to be launched in September 2020. • AI system principles for non-discrimination were delivered at the end of 2020. The aim of these system principles is to provide individuals and organisations that are building or implementing AI systems in practice with specific guidance in order to minimise bias and discriminatory patterns within such systems. • The Code for Good Digital Public Governance was developed in 2020. This code provides an overview of the principles of good digital governance and opens up a dialogue with administrators on these principles. • In cooperation with the Ministry of the Interior and Kingdom Relations and the Social Affairs and Employment Inspectorate, the Ministry of Education, Culture and Science organised an Online Anti-Discrimination Hackathon in November 2020. The event challenged experts to come up with creative solutions to combat discrimination in automated recruitment and selection systems.	• We will continue to foster citizen dialogue on the effects of digitalisation, including at the Public Spaces Conference in spring 2021. • In 2021, the AI system principles will be applied in settings such as Ethical Legal Societal Aspects (ELSA) labs. One example is an ELSA project in which AI is being developed to combat debt and poverty issues. • The Impact Assessment on Human Rights and Algorithms (IAMA) will be developed in 2021. The purpose of IAMA is to identify and mitigate human rights risks throughout the life cycle of technological systems. IAMA is expected to be completed in April 2021. • In order to focus the attention of the business sector on the responsible use of technology, the government is currently developing a Children's Rights Online Code to provide companies with guidance on the safeguarding of children's rights. This will be completed in 2021. • In January 2021, the Ministry of the Interior and Kingdom Relations' Start-up in Residence programme will set start-ups in a broader sense the challenge of developing methodologies to detect biases in AI systems. • The Ministry of the Interior and Kingdom Relations will also launch the Human-centric AI Award in 2021, which will be presented to an AI application that not only safeguards but also reinforces human rights.	Ministry of the Interior and Kingdom Relations (ongoing)
Reliable information and content on online platforms An open information society in which the democratic rule of law is protected and illegal online activities are prosecuted.	51 Additional resources have been earmarked for investigative journalism.	The Coalition Agreement structurally earmarks an annual sum of €5 million to encourage investigative journalism in the Netherlands. The Dutch Journalism Fund and Dutch Fund for In-depth Journalism – two funds supporting investigative journalism in the Netherlands – established schemes to support investigative journalism editorial staffs and projects and encourage talent development over the course of 2018.	The effectiveness of these plans will be monitored and evaluated in collaboration with the two funds. The structural application of these resources will be assessed in the spring.	Ministry of Education, Culture and Science (Q4)

Appendix 2: Progress Report Digital Connectivity Action Plan

Theme: Efficient spectrum usage

Task	Action	Current status/results (up to the end of Q1 2021)	What are we going to do? (after Q1 2021)	Who (timeline)
Allocation and distribution of frequency bands	International coordination of spectrum usage	One of the outcomes of the World Radiocommunication Conference 2019 (WRC-19) was the global identification of additional spectrum for mobile telecommunication services in the bands 24.25–27.5 GHz, 37–43.5 GHz and 66–71 GHz. WRC-19 set the agenda for WRC-23, which includes: • considering the identification of the bands 3,300–3,400 MHz, 3,600–3,800 MHz, 6,425–7,025 MHz and 10.0–10.5 GHz for mobile services. This concerns the various International Telecommunication Union (ITU) regions. With regard to the Netherlands, which is part of ITU Region 1, there is a specific focus on the bandwidth part 6,425–7,125 MHz, which may be interesting as what is known as a '5G intermediate bandwidth part' for international mobile telecommunications use (a band between 3.5 GHz and 26 GHz); • reviewing spectrum usage and spectrum needs in the frequency band 470–960 MHz (UHF band). In addition to these CEPT and ITU activities, the drafting of an Opinion on WRC-23 in the RSPG WG WRC-23 has commenced in preparation for a Council Resolution on the EU frameworks to be observed by the Member States during WRC-23.	• Prepare for WRC-23 at the national, European and global level. This mainly involves taking part in various working groups within the European Conference of Postal and Telecommunications Administrations (CEPT), the ITU and the RSPG, in addition to informal contact with colleagues from other Member States where necessary.	Ministry of Economic Affairs and Climate Policy (2020–2023)
		The European Radio Spectrum Policy Group (RSPG) provides strategic advice to organisations including the European Commission on important radio spectrum policy issues. The Netherlands participates in this group through the Ministry of Economic Affairs and Climate Policy. The RSPG's work programme includes a recommendation on a new radio spectrum policy programme (RSPP). This is a long-term programme that incorporates guidelines and objectives for the strategic planning and harmonisation of radio spectrum usage for electronic communications networks and services.	The RSPG recommendation for a new RSPP will be published around summer 2021. The recommendation will address a number of topics, including additional spectrum requirements for future wireless broadband networks. The EC will then make a motion for the Council and EP to pass a resolution to adopt the new RSPP.	Ministry of Economic Affairs and Climate Policy (2021)

Task	Action	Current status/results (up to the end of Q1 2021)	What are we going to do? (after Q1 2021)	Who (timeline)
	Allocation of the 3.5 GHz band	The contours of the allocation policy for the 3.5 GHz band were outlined in the 2019 Memorandum on Mobile Communications. The auctioning of the 3.5 GHz band is expected to take place in early 2022.	Preparations for the 3.5 GHz auction commenced in 2020. 2020 saw research into topics such as the appropriate auction model and the level of the reserve price. In addition, technical research was carried out to help shape the draft licences. The results of these studies will be taken into account in drawing up the auction regulations, which will be subject to a consultation process in 2021 and will be published following their adoption. In order to be able to deliver the 3.5 GHz band 'clean', Radiocommunications Agency Netherlands is drawing up a plan for the migration of the existing local users. This plan is expected to be adopted before the summer..	Ministry of Economic Affairs and Climate Policy (2021)
	Allocation of the 26 GHz band	An initial market consultation was completed in January 2020.	• The consultation responses are currently being processed and policy and award options are being formulated. • This will be followed by a second consultation on the policy and award options.	Ministry of Economic Affairs and Climate Policy (2021)
	Creation of sufficient spectrum for company-specific applications	• Within the 3.5 GHz band, 2 x 50 MHz will be dedicated to local use, including company-specific applications. • The options for permitting local use in the 3.8–4.2 GHz band under certain conditions are being explored.	• Award policy and licensing conditions will be adopted for the 2x50 MHz in the 3.5 GHz band. • Options will be explored for alternative spectrum for company-specific applications in the 3.8–4.2 GHz and 26 GHz bands. The Ministry of Economic Affairs and Climate Policy and Radiocommunications Agency Netherlands will liaise with the business community to monitor the development of demand.	Ministry of Economic Affairs and Climate Policy (2021) Ministry of Economic Affairs and Climate Policy (2021) Ministry of Economic Affairs and Climate Policy (ongoing)
	Frequency bands reserved for broadcasting	The Memorandum on Broadcasting Distribution will be postponed. The radio distribution policy, a crucial component of the Memorandum on Broadcasting Distribution, is being prioritised in view of the political situation. In addition, a number of policy initiatives of the Ministry of Education, Culture and Science that could potentially have an impact on the Memorandum, such as the review of the public broadcasting system and the cooperation agenda between public and commercial media parties, are still in full swing.	The State Secretary has already decided that there is no need for a separate Memorandum on Broadcasting Distribution, so the action can be considered closed.	

Task	Action	Current status/results (up to the end of Q1 2021)	What are we going to do? (after Q1 2021)	Who (timeline)
Facilitating role to enable parties to optimise spectrum usage (excluding antenna policy, see below)	Promotion of innovation	• At the Dutch Digital Conference, the Ministry of Economic Affairs and Climate Policy organised a meeting between connectivity providers and users. During this meeting the 5G Charter (5G Handvest) was presented. • n 2018 and 2019, sessions were held with four universities of technology, the University of Groningen (RUG), the Netherlands Organisation for Applied Scientific Research (TNO), SURFnet and Radiocommunications Agency Netherlands to explore whether a joint digital connectivity research agenda could be established for 5G. The knowledge institutions announced their ambition to produce a joint 'beyond 5G' research agenda.		
		• As of 1 March 2021, Radiocommunications Agency Netherlands had granted 125 experimentation licences, including in the 3.5 GHz band and the 26 and 28 GHz bands. • In 2018 and 2019, the 5G innovation network held meetings in collaboration with NL Digital. • In 2018/2019, the Ministry of Infrastructure and Water Management collaborated with the Ministry of Economic Affairs and Climate Policy to carry out a market consultation on 5G and smart mobility. The Ministry of Infrastructure and Water Management launched a cross-border 5G pilot project between the Netherlands and Belgium. • In 2018, around 30 relevant parties were informed about the upcoming grant round for the Horizon 2020 programme (aimed at pilot projects). • In 2020, a webinar was organised for companies in the manufacturing industry in collaboration with parties including the FME (the Dutch employers' organisation for the technology industry). The subject of the webinar was 5G applications in smart industry.	• Together with the parties involved, the Ministry of Economic Affairs and Climate Policy will explore a number of 5G application domains in greater depth, such as agriculture, health care and smart industry. • The Ministry of Economic Affairs and Climate Policy/Netherlands Enterprise Agency will organise an information meeting on the new European innovation partnership for 5G/6G. • The Ministry of Economic Affairs and Climate Policy has set up a working group for the exchange of knowledge between public 5G field labs.	and Climate Policy (2021) Q1/2 (ongoing)

Theme: Support for the smooth roll-out of high-speed internet (fixed and mobile) at local level

Task	Action	Current status/results (up to the end of Q1 2021)	What are we going to do? (after Q1 2021)	Who (timeline)
Setting clear national frameworks through laws and regulations	Establishing international standards for the maximum allowable exposure to electromagnetic fields (EMF) under the Telecommunications Act	The draft decision underwent a public consultation process at the end of 2020.	The consultation responses are currently being processed and the final outstanding responses are being followed up.	Ministry of Economic Affairs and Climate Policy/Radiocommunications Agency Netherlands (Q1)
	Adopting the ministerial regulation on geographical research into telecommunication networks	Drafting of ministerial regulation	Consultation on ministerial regulation	Ministry of Economic Affairs and Climate Policy (2021)
	Enabling the placement of small cells on physical infrastructure controlled by public bodies as part of the introduction of the Electronic Communications Code	A bill is being prepared and was submitted by the government to the Council of State last December. Once the advice of the Council of State has been received and processed, the bill can be submitted to the House of Representatives. The intention is to submit the bill to the House of Representatives in the second quarter of 2021.	The bill is scheduled for debate by the House of Representatives in the second quarter of 2021 at the earliest	Ministry of Economic Affairs and Climate Policy (Q2)
		Last year, a study was carried out into the administrative and financial implications of the obligation on government authorities, imposed in Article 57 of the Electronic Communications Code, to agree to reasonable requests for shared use of public infrastructure by mobile telecom operators. The study was discussed by the focus group and the decision was made to include a cover sheet with the study to clarify the main findings and preparatory activities that municipalities may need to carry out.	Publication of the study and the cover sheet	Ministry of Economic Affairs and Climate Policy (Q1)

Task	Action	Current status/results (up to the end of Q1 2021)	What are we going to do? (after Q1 2021)	Who (timeline)
	Revision of the EU Broadband Cost Reduction Directive	The Ministry of Economic Affairs and Climate Policy has responded to the EC consultation on revising the EU Broadband Cost Reduction Directive. Market players and municipalities were also involved. In parallel to the formal consultation process, the European Commission published a recommendation last autumn that called on Member States to develop a toolbox of best practices to accelerate the roll-out of high-speed fixed and mobile networks, which also took into account the recommendations made in the Broadband Cost Reduction Directive. At the time, an inventory was made of the steps that Member States are already taking in this area. In the first few months of 2021, this inventory will be distilled into a toolbox. The Ministry of Economic Affairs and Climate Policy contributed to the creation of the toolbox on behalf of the Netherlands.	EC proposal expected in Q1 of 2022 • Elaboration of a phased plan for the implementation of the toolbox • Implementation of the phased plan	Ministry of Economic Affairs and Climate Policy (Q2) Ministry of Economic Affairs and Climate Policy (2021–2022)
Promotion of transparency and harmonisation of local policy [1]	Working with municipalities and the market to develop standards to promote the harmonisation of local policy	In 2020, the network of local authorities was strengthened by the creation of a digital connectivity task force. In early 2021, a working group made up of representatives of the municipalities and fixed telecom providers was launched for the specific purpose of identifying local opportunities and challenges in the area of fixed connectivity. The aforementioned task force and working group aim to work together to develop standards, such as manuals, guidelines and sample memoranda, to encourage the harmonisation of local policy.	Products in whose creation or commissioning the Ministry of Economic Affairs plays a leading role: • Update of sample memorandum on municipal antenna policy • Comprehensive guideline on administrative (telecom) fees • Preliminary investigation into degradation resulting from the deployment or relocation of cables and pipes • Minimum framework for handling requests for shared use of physical infrastructure controlled by public bodies	Ministry of Economic Affairs and Climate Policy/Antenna Bureau (Q2) Ministry of Economic Affairs and Climate Policy (Q2/3) Ministry of Economic Affairs and Climate Policy (Q2/3) Ministry of Economic Affairs and Climate Policy (2021–2022)
		Entering into discussions with the Association of Netherlands Municipalities (VNG) and operators on the extension of the Antenna Covenant after 2019 in order to be well prepared for the roll-out of 5G antennas [2]	At the end of 2020, a new covenant was concluded between central government, operators and the VNG [3]	

[1] This also implements the motions put forward by Members Weverling and Sjoerdsma (Parliamentary Paper 24 095, no. 452) and Weverling (Parliamentary Paper 24 095, no. 521)

[2] This also implements the motions put forward by Members of Parliament Van Eijs and Weverling (Parliamentary Paper 24 095, no. 456)

[3] Letter to the House of Representatives 26 643, no. 736

Task	Action	Current status/results (up to the end of Q1 2021)	What are we going to do? (after Q1 2021)	Who (timeline)
	Project by the Ministry of the Interior and Kingdom Relations, in collaboration with the Ministry of Infrastructure and Water Management and the Ministry of Economic Affairs and Climate Policy, to investigate ways of coordinating use of the subsoil (subsoil harmonisation project)	In 2020, the Cable and Pipeline Knowledge Arena was set up as part of the Programme for Integrated Chain Collaboration in the Subsoil, which is being run by the Netherlands Centre for Underground Construction (COB) and the Municipal Platform for Cables and Pipelines (GPKL). In early 2021, an online meeting was held on the progress of the projects within the Knowledge Arena. At the end of 2020, the Public Space City Deal was launched, in which several large municipalities and ministries have joined forces to work together on an integrated approach to transition tasks in urban public spaces over the next three years.	The Ministry of Economic Affairs and Climate Policy will take part in the research project *Fabels en feiten over kabels en leidingen* (Cables and pipelines: fables and facts). As part of the project, a working group will seek to harmonise the regulations governing underground infrastructure.	All (ongoing)
Promotion of knowledge sharing with and between local authorities	Developing and distributing information material via online and offline channels	Last year, the Ministry of Economic Affairs and Climate Policy intensified the provision of information to municipalities and the public. The following actions were carried out to this end: • The overalsnelinternet.nl website was further expanded and monthly newsletters were issued • Development of a communication tool kit, including a variety of information material (e.g. infographics, videos, FAQs) to support municipalities in their communication on mobile telecommunications and 5G to their residents and councillors • Development of fact sheets by the Antenna Bureau, including 'Local policy and small antennas' and 'differences between 4G and 5G'	• The Ministry of Economic Affairs and Climate Policy will continue to expand the website and issue monthly newsletters • Where relevant, the communication toolkit will be supplemented with new materials • In the coming year, the Ministry of Economic Affairs and Climate Policy/Antenna Bureau will develop new fact sheets, including a fact sheet on 'shared use'	Ministry of Economic Affairs and Climate Policy (ongoing)
	Working with local governments and the market on best practices to facilitate the roll-out of high-speed internet[4]	We have published the best practices gathered to date on overalsnelinternet.nl.	We continue to appeal to local authorities (via our monthly newsletter) to share more best practices on the website overalsnelinternet.nl.	Ministry of Economic Affairs and Climate Policy (ongoing)

[4] This also implements the motion put forward by Member of Parliament Weverling (Parliamentary Paper 24 095, no. 450)

Task	Action	Current status/results (up to the end of Q1 2021)	What are we going to do? (after Q1 2021)	Who (timeline)
	Research into the expected growth in antenna installations in the coming years	In January, an initial report was delivered to a focus group consisting of the Ministry of Economic Affairs and Climate Policy, a number of municipalities, the VNG and mobile operators.	Publication of the results	Ministry of Economic Affairs and Climate Policy (Q2)
	Promoting knowledge sharing between provinces and municipalities faced with the challenge of deployment of high speed broadband to very isolated addresses or rural areas	In early 2021, the Ministry of Economic Affairs and Climate Policy held talks with provinces on the possibilities for deployment of high speed broadband to challenging rural areas. In addition, the Ministry of Economic Affairs explored funding options for the deployment of fixed internet access for households in 'white' areas (i.e. areas without coverage) at the start of 2021.[5] The findings were shared with the provinces.	• Over the coming year, the dialogue with the provinces will continue every quarter under the leadership of the Ministry of Economic Affairs and Climate Policy. • Publication of a simple list of guidelines to be followed when awarding government grants for the installation of high-speed internet. The House of Representatives is expected to be informed about this in April.	Ministry of Economic Affairs and Climate Policy (2021) Ministry of Economic Affairs and Climate Policy (Q2) Ministry of Economic Affairs and Climate Policy (Q1)
	Annual update of the broadband map to show the number of addresses with and without high-speed fixed internet per municipality	The new map for 2020 has been published and can be found at overalsnelinternet.nl/breedbandkaart.	The House of Representatives is expected to be informed about this in April. The broadband map will be updated next year, based on new data.	Ministry of Economic Affairs and Climate Policy (Q1) Ministry of Economic Affairs and Climate Policy (ongoing)

[5] This also serves to implement the motion put forward by Member of Parliament Bromet et al. (Parliamentary Paper 24 095, no. 522)

Theme: Promoting sufficient competition and investment

Opgave	Actie	Stand van zaken / resultaten (t/m Q1 2021)	Wat gaan we doen? (vanaf Q1 2021)	Wie (tijd)
Promoting sufficient competition and investment	Exploration of interest in co-investment by telecom parties in FTTH roll-out	The House of Representatives was informed of the status in December 2020.[6] The Netherlands Authority for Consumers and Markets (ACM) is working on an update of the 2019 market study. We will await the new findings of the ACM before informing the House of Representatives. In the meantime, the Ministry of Economic Affairs and Climate Policy will remain in constant dialogue with market parties, municipalities and the ACM about developments in the fibre-to-the-home market.	The House of Representatives is expected to be informed about this in April.	Ministry of Economic Affairs and Climate Policy (Q1)
	Investigation into whether the Telecom Act enables municipalities to better regulate competition between market parties	The possibilities under the current and new European telecom framework will be analysed.	The House of Representatives is expected to be informed about this by the end of March.	Ministry of Economic Affairs and Climate Policy (Q1)
	Data centre market studies	Finalise research into data centre market/capacity	A further discussion will be held with stakeholders about developments in the data centre market.	Ministry of Economic Affairs and Climate Policy (Q2)
	Research into the submarine cable market and establishment of the preconditions for the installation of new submarine cables	Round-table discussion on submarine cables organised and accompanying letter submitted to the House of Representatives setting out follow-up actions [7]	• Secure cable routes in the North Sea (North Sea vision 2022–2027) • Draw up a licence guide/phased plan for landing submarine cables • Put the market for submarine cables on the European agenda	Ministry of Economic Affairs and Climate Policy (Q2)

[6] Letter to the House of Representatives 26 643, no. 725

[7] Letter to the House of Representatives 26 643, no. 741

Appendix 3: Overview of financial resources for the digital economy

The House of Representatives has requested a general report on the available financial resources for the digital economy[1]. The resources earmarked for the digital economy are largely made available through generic instruments, as well as a number of specific investments. In addition, the government recently announced that the National Growth Fund will provide a stimulus for the digital transition.

1. Generic innovation instruments*

The overview below outlines the various generic instruments available to entrepreneurs engaged in digital technology research and innovation[2].

The Netherlands focuses on a bottom-up approach (based on the use of generic instruments), including the Research and Development Promotion Act subsidy [WBSO] and the Public-Private Partnership [PPP] allowance. In the case of WBSO, subsequent analysis shows that a considerable portion of the budget is spent on digital technology innovations:

Table 1: Generic instruments

x €1 million, status as at the Draft Budget 2021	2021	2022	2023	2024	2025
Subsidies					
PPP allowance	166	195	205	192	179
International innovation	52	61	50	44	40
Innovation credit	49	57	57	59	58
Eurostars	18	18	18	18	18
MIT	41	40	40	41	41
Tax incentives					
WBSO	1.438	1.281	1.281	1.281	1.281
Total	**1.764**	**1.652**	**1.651**	**1.629**	**1.617**

* including digital innovation, not specifically labelled

WBSO and digital innovations:

Year	R&D tax benefit granted	Share of ICT technology area
2016	€ 1.469 million	€ 321 million (22%)
2017	€ 1.455 million	€ 303 million (21%)
2018	€ 1.374 million	€ 290 million (21%)
2019	€ 1.521 million	€ 304 million (20%)
2020 (expected)	€ 1.552 million	€ 319 million (21%)

Source: Focus annual report 2016–2019. The amounts for 2020 are estimated on the basis of expected depletion. The final amounts will be presented in the Annual Report 2020.

1 Parliamentary Paper 26 643, no. 563.

2 In Table 1: Generic instruments, the available budget for the WBSO tax credit for research and development is lower than the R&D tax rebate granted for 2020, as not all R&D tax rebate granted is actually redeemed.

2. Specific resources

2.1 Specific resources: investment in Smart Industry field labs and the SME action plan

Generic instruments may be applied towards specific programmes, such as Smart Industry and the SME action plan (which also focuses on digitalisation). In addition, €15.6 million is available for the SME action plan to accelerate digitalisation in the SME sector. The specific Smart Industry investments in field labs can be found in Table 2. Since the start of the programme in 2015, a total of €367 million in public and private funds has been invested in the establishment and implementation of field labs.

Broad efforts are being made within both programmes to promote the digitalisation of industry and SMEs. I refer you to the relevant letters and reports for an overview of the resources (from various sources) earmarked for these specific programmes.[3]

[3] Parliamentary Papers 32 637, no. 316 + 29 826, no. 94 and https://www.smartindustry.nl/wp-content/uploads/2019/05/Smart-Industry-Fieldlabs-2018.pdf

Tabel 2: Specific investments in Smart Industry field labs[4]

Source of funding (x €1 million)	2017	2018	2019	2020
European Union	22 (12%)	27 (11%)	34 (11%)	40 (11%)
Central government	29 (16%)	65 (27%)	83 (26%)	88 (24%)
Regions	27 (15%)	29 (12%)	47 (15%)	56 (15%)
Private	82 (46%)	96 (40%)	117 (37%)	148 (40%)
Knowledge institutions	18 (10%)	24 (10%)	34 (11%)	34 (9%)
Total	**178**	**240**	**314**	**367**

Furthermore, the government approved specific missions for its Mission-Driven Top Sector and Innovation Policy and the action plan for the development of key technologies last year.[5] A focus on digital technologies will be key in fulfilling these missions.

2.2 Specific resources: AI investments

Investments in AI are vital in achieving the ambitions and goals of the Strategic Action Plan for AI (SAPAI)[6]. In the recent Growth Letter[7], the government stated once again that the Netherlands must continue to invest in building new research and innovation ecosystems, including AI. With this report, the government is implementing the motion put forward by Members of Parliament Verhoeven and Amhaouch, which asks the government to make its investments in AI transparent on an annual basis and subsequently verifiable[8].

The situation with regard to annual central government investment in AI research and innovation is as follows (2020 and 2021, with extrapolation of the estimated figures for the years 2022–2024, excluding WBSO):

[4] Source: 2020 Smart Industry Field Labs Monitor by the Netherlands Organisation for Applied Scientific Research (TNO)

[5] Parliamentary Papers 33 009, nos. 63 and 70.

[6] Parliamentary Paper 266 43, no. 640

[7] Conference number 49, item 36

[8] Parliamentary Paper 35 300-XIII, no. 57

a) €26 million through thematic AI calls and projects related to research, innovation and human capital (see additional information below).

b) €4 million through Ministries other than the Ministry of Economic Affairs and Climate Policy and the Ministry of Education, Culture and Science.

c) €15 million through the international innovation grant scheme for business participation in EU technology programmes (Eureka) (see additional information below).

In 2019, SAPAI estimated basic central government funding for AI research and innovation at around €45 million per year. This is also the estimate for 2020 and 2021.
At that time, it was not yet known how much budget could be allocated to AI retrospectively from the broad national schemes of the Ministry of Economic Affairs and Climate Policy. This turned out to be €28 million for 2019 (Netherlands Enterprise Agency analysis for 2019, excluding WBSO).

Additional information for a): thematic AI calls and projects relating to research, innovation and human capital (€26 million per year in total)

As stated in the DDS 2020 Update and Progress Report[9], the Ministry of Economic Affairs and Climate Policy has made a kickstart fund for AI available for the period 2020–2024, totalling €23.5 million. These funds are designed to support economic development and technology and were earmarked by the Ministry of Economic Affairs and Climate Policy in the Knowledge and Innovation Covenant (KIC) for the implementation of the key technology knowledge and innovation agenda. Of this, €3.5 million was used in 2020 and €5 million will be used in 2021 in areas such as data sharing for AI, human capital and strengthening regional cooperation. Average: €4 million per year for the period 2020–2024.

The Ministry of Education, Culture and Science has promised a grant of up to €7.5 million for a period of around five years to support a new thematic National Science Agenda (NWA) AI research programme at the Netherlands Organisation for Scientific Research (NWO).[10] he grant will be made available on a 50/50 matched-funding basis with contributions to be provided by other Ministries. The Ministry of Economic Affairs and Climate Policy, the Ministry of the Interior and Kingdom Relations and the Ministry of Defence have indicated that they will also contribute funding. The call itself has yet to be issued. Average: €3 million per year for the period 2021–2025.

From the annual central government grant to the Netherlands Organisation for Applied Scientific Research (TNO), TNO will invest approximately €6 million per year in the years 2020 and 2021 in AI programmes for applied research into innovations in AI and approximately €4 million per year in research for innovation in AI (e.g. care, mobility, energy, built environment and safety).

The Ministry of Education, Culture and Science/ NWO conduct generic research investment programmes. Accepted projects can only be earmarked as AI in retrospect. For example, within the NWO's Gravity Programme, a single AI project for top research was accepted in 2019 and awarded a €19 million grant (10-year term). At the end of April 2020, new projects were funded as part of the second investment round of the National Road Map for Large-Scale Scientific Infrastructure (2016–2020). These projects relate to a number of large research facilities worth a total of €35 million in the areas of AI, data sharing and computing power for radio astronomy, social sciences and DNA research and biodiversity. The projects concern scientific research, not public-private partnerships, and have been awarded an average grant of €5.5 million per year.

[9] https://www.rijksoverheid.nl/documenten/rapporten/2020/06/25/nederlandse-digitaliseringsstrategie-2020

[10] Parliamentary Paper 33 009, no. 91

In March 2021, the Ministry of Economic Affairs and Climate Policy and the Ministry of Education, Culture and Science awarded a grant under the Thematic Technology Transfer scheme to a partnership of five universities, four university medical centres, the Centre for Work and Income (CWI) and a venture investor in order to fast-track the market launch of medical technology using AI. The grant component amounts to an average of around €0.45 million per year for the period 2021–2026.

On the initiative of the Ministry of Economic Affairs and Climate Policy, the ICT top sector and the NWO, a thematic AI call (Responsible Use of Artificial Intelligence) with a total value of €2.3 million was awarded to six PPP projects with a four-year term. Projects within top sector programmes that feature an AI component can also be earmarked in retrospect, including for example the Applied and Engineering Sciences (TTW) 'Efficient Deep Learning' Perspective programme (€3.5 million in total for 2017–2022). The calls of the Dutch E-Science Centre are also non-thematically AI-oriented. On average, the thematic and non-thematic NWO grants are estimated to total around €3 million per year.

Together, these public funding contributions add up to an average of €26 million per year.

Parliamentary Paper 33 009, no. 91

In 2020, a cross-cluster AI call was launched as part of an overhaul of the Eureka cluster programme set-up. This call was successful. Five Eureka clusters and 15 Eureka countries took part. The Dutch budget of €5 million benefited three projects (Deep Neural Networks and spectroscopy, a smart sensor platform for water quality and AI for the calibration and optimisation of transmission electron microscopes). Two large companies, four knowledge institutions and five SMEs are involved in these projects in the Netherlands. A second AI call is currently in the preparatory phase, with a budget of €4 million in 2021.

The Eureka ITEA cluster programme (software intensive systems) is already largely focused on AI (perception, advanced user interfaces, command, deep learning and digital twin). This also applies to the Eureka PENTA cluster programme (micro-electronics).

In addition, several calls for AI-related project proposals were launched in the last year of the EU Horizon 2020 programme (2014–2020). Due to the coronavirus pandemic, the schedule has been put back, so not all the results for 2020 are known yet. Based on the current status, a minimum of €44 million will have been earmarked for Dutch businesses, research institutes and universities participating in AI-related projects over the course of Horizon 2020.

Outlook for European funds

This year sees the start of the EU Horizon Europe programme (2021–2027), which focuses on R&D&I cooperation between businesses, universities and research institutes. Of the more than €80 billion in the Horizon Europe budget, more than €15 billion has been earmarked for the Digital Industry and Space cluster. More than €1 billion of this sum will directly fund AI-focused R&D&I.

Many calls relating to AI and big data are anticipated within this cluster. A special AI, Data and Robotics partnership will be set up and AI is one of the focus areas of the Key Digital Technologies (KDT) partnership.

The Horizon Europe programme (2021–2027) will be launched alongside the new Digital Europe programme, which aims to accelerate the digitalisation of Europe by building strategic digital capacity and facilitating the EU-wide deployment of digital technologies like AI. A total of €7.5 billion in funding is available for this programme, of which more than €2.1 billion will be invested in AI. Digital Europe operates on the basis of co-financing. A sum of €50 million has been reserved in the Ministry of Economic Affairs and Climate Policy budget for the next four years.

AI within WBSO

The long-running WBSO scheme is a tax incentive scheme for business owners to reduce labour costs for research and development (at the company level). WBSO is not a PPP instrument. Looking back, the number of projects involving

AI (particularly machine learning) within the WBSO scheme has grown, although no figures are available on the size of AI investments under the WBSO scheme.[11]
The results of the WBSO analysis have not been validated and are a rough estimate. This means that where an AI term is mentioned for a project, it is not certain whether the company itself developed AI as part of the project. In addition, the results have not been checked by experts. A new validated results analysis using a more precise method will be presented in 2021. The results may therefore differ from the figures in this estimate.

SAPAI features a table showing data up to and including 2018. This analysis has been extended to include 2019.

3. National Growth Fund

At the time of finalising this update, it was announced that resources had been allocated from the National Growth Fund for digitalisation.[12] In order for the Netherlands to keep up with the world leaders in AI, a proposal was submitted in the first tranche of the National Growth Fund: AI for the Netherlands, a comprehensive, long-term public-private investment programme for research and innovation. On 9 April of this year, the National Growth Fund's proposal assessment advisory committee awarded a maximum of €276 million in funding for the AiNed investment programme, consisting of a €44 million grant, a €44 million conditional grant and a €188 million reserve. A further €80 million has been made available for a National Teaching Lab and another €63 million has been set aside to scale up promising prototypes for digital applications in education.[13]

AI within WBSO

	2014	2015	2016	2017	2018	2019
Accepted WBSO projects involving an AI/ machine learning term	2.789	3.478	4.531	5.822	7.491	8.532
Total WBSO projects accepted	152.738	149.743	142.855	135.900	130.273	127.579
Percentage of WBSO projects involving an AI/machine learning term	1,8%	2,3%	3,2%	4,3%	5,8%	6,7%

Source: Netherlands Enterprise Agency|WBSO|1 December 2020

[11] Focus op research & development. WBSO in 2019 (Focus on research and development: WBSO in 2019) (Figure 1, page 14) https://www.rijksoverheid.nl/documenten/jaarverslagen/2020/06/04/focus-op-research-and-development---de-wbso-in-2019).

[12] https://www.rijksoverheid.nl/documenten/kamerstukken/2021/04/09/kamerbrief-bekostiging-investeringsvoorstellen-uit-nationaal-groeifonds

[13] For further information, see https://www.rijksoverheid.nl/documenten/rapporten/2020/09/30/verkenning-naar-het-nederlandse-onderwijslab-artificiele-intelligentie