

# Mission AI

*AI in pictures*

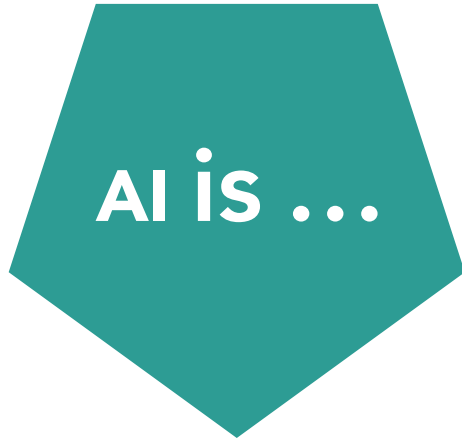
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WRR

THE NETHERLANDS SCIENTIFIC COUNCIL FOR GOVERNMENT POLICY



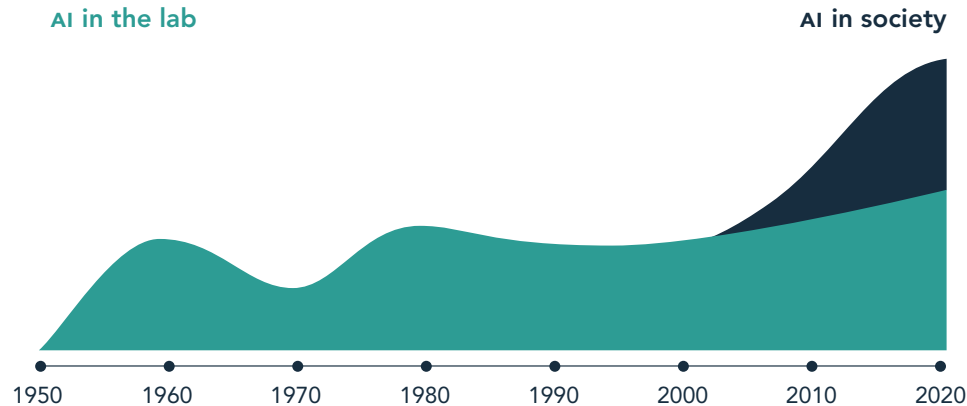
# What is AI?



Systems that display intelligent behaviour  
by analysing their environment and  
– with some degree of autonomy –  
taking actions to achieve specific goals.

... initially difficult to define, as what we understand as artificial intelligence, or AI for short, coevolves with our understanding of human intelligence. In the broadest definition, AI is equivalent to algorithms, while in the strictest definition, it is the replication of all human intelligence. In the first case, almost everything is AI; in the latter nothing is. It is therefore better to define AI as computer systems that can, to a greater or lesser extent, independently take actions to achieve specific goals. In this sense, AI systems exhibit intelligent behaviour: they can perform tasks that involve a certain degree of intelligence.

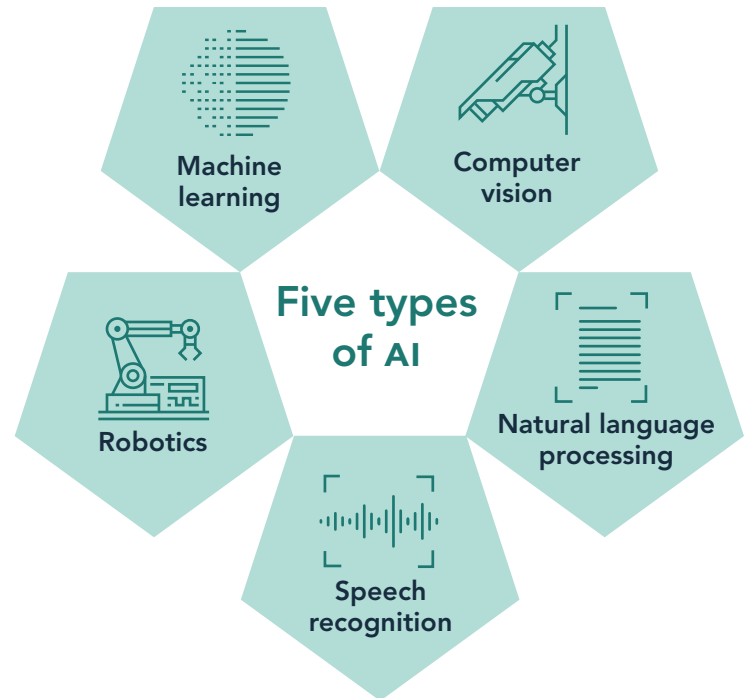
# AI is leaving the lab and entering society



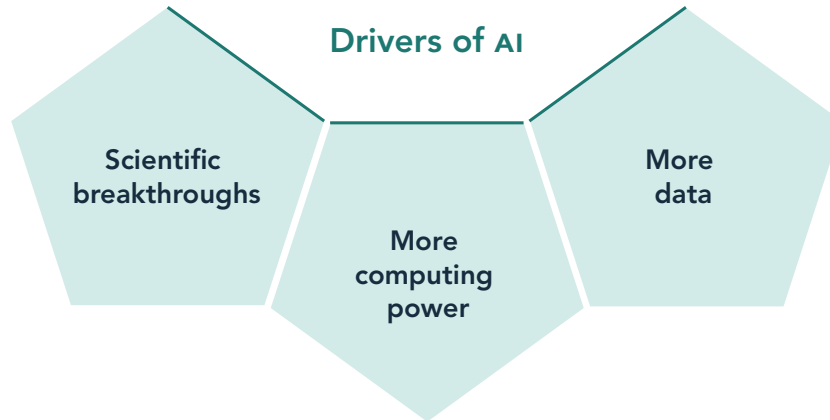
AI appeared in the lab in 1956 when the *Dartmouth Summer Project on AI* was organized. Since then, the field has gone through three waves of resurgence and two winters of disappointment. A turning point was reached at the beginning of this century: AI is now definitely entering society and gaining social impact.

# Five fields of AI application

- *Machine learning* is about specific analyses that make predictions. Examples include Amazon or Netflix recommendations, as well as systems that make predictions about fraud.
- *Computer vision* is about recognizing patterns in visual images (often photos or videos). This includes facial recognition on social media or autonomous vehicles that recognize traffic situations.
- *Natural language processing* focuses on text and is found in machine translation tools such as Google Translate or the messenger bots that many companies use on their websites.
- *Speech recognition* focuses on spoken language. Well-known applications are voice-controlled virtual assistants such as Siri and automated reporting.
- *Robotics* combines the ability to manipulate objects with other forms of AI. Examples are intelligent drones and sorting robots in warehouses.



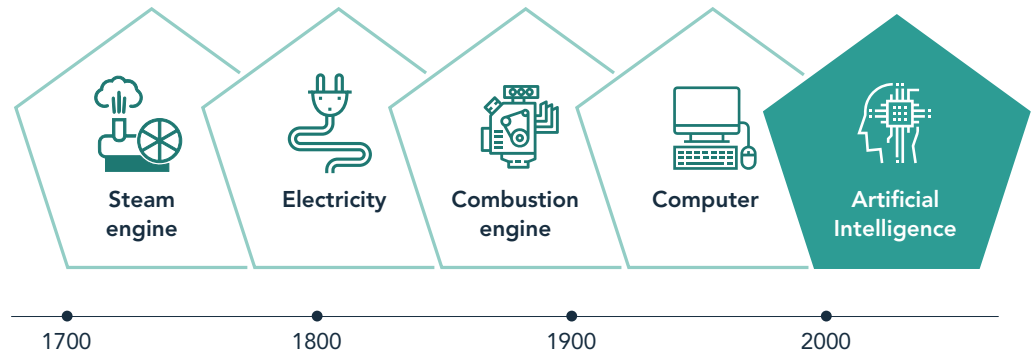
# Three drivers of advances in AI



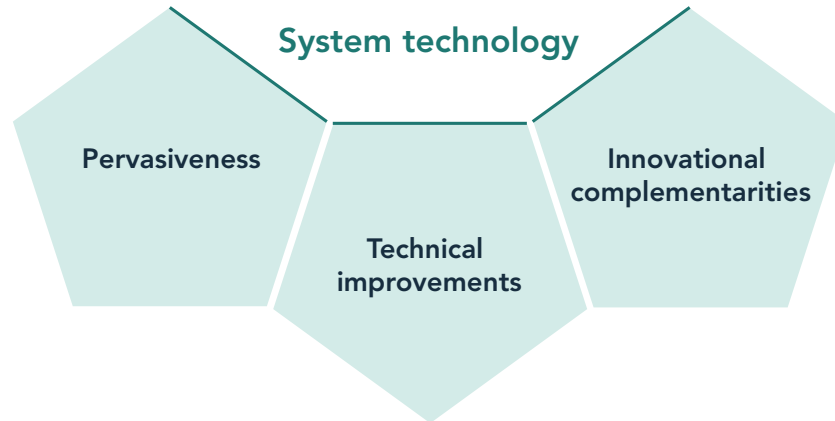
- **Breakthroughs in science:** There have been more and more scientific breakthroughs in the field of neural networks since the 1980s. This means that algorithms can discern and compare patterns on multiple layers, known as deep learning.
- **Greater computing power:** Moore's Law describes a doubling of computing power approximately every 18 months, which means that computing power is growing rapidly and increasingly complex calculations can be made.
- **More data:** The advent of the internet, social media, online services and sensors in devices provide an immense amount of data for the training and application of algorithms.

# AI is a new system technology

AI is not just another technology. AI is best compared to the steam engine, electricity, the combustion engine and the computer. These are system technologies. They are technologies that can be used throughout the economy and society for a variety of purposes. As a result, such technologies have a great impact that is, moreover, highly unpredictable. For AI we can learn from dealings with these earlier technologies



# Characteristics of a system technology



A system technology...

- ... can be applied within a variety of domains and is therefore ubiquitous;
- ... goes through a continuous process of technological improvement, resulting in lower costs and higher efficiency;
- ... can, together with other technologies, generate more innovation.

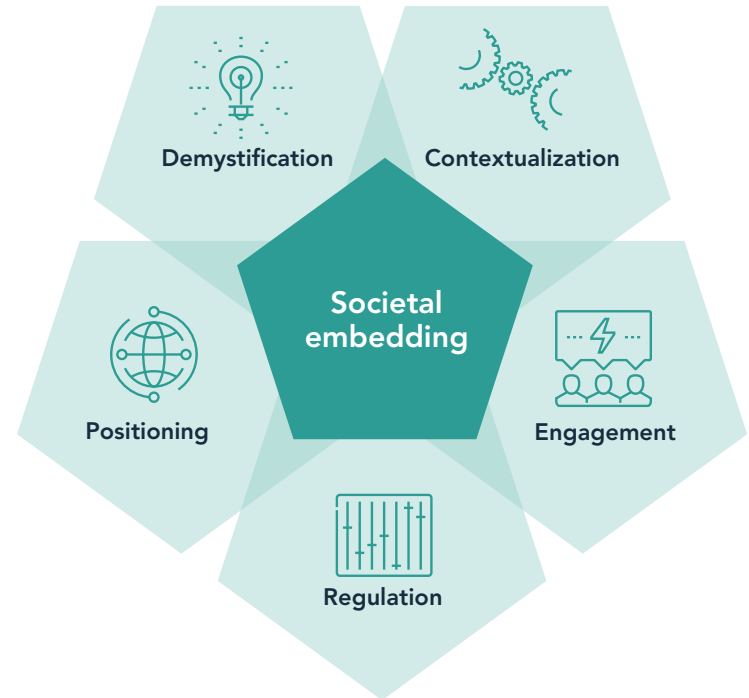
AI meets all three of these characteristics.

# Embedding AI within society entails five overarching tasks

History shows that society has to deal with five overarching tasks when it comes to societal embedding of system technologies:

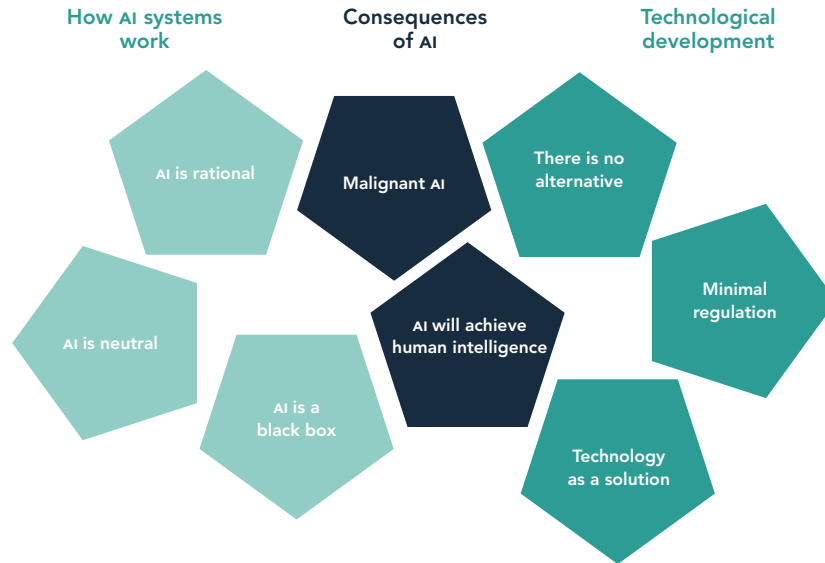
1. *Demystification*: dealing with unrealistic beliefs and images of the new technology.
2. *Contextualization*: creating the technical and social environment needed for the technology to function in practice.
3. *Engagement*: involving groups in civil societies in the development and application of the technology.
4. *Regulation*: establishing frameworks for the new technology at various levels.
5. *Positioning*: thinking strategically about a country's relationship to parties beyond its borders.

AI also presents society with these five overarching tasks.





# Task 1 – Demystification: What are we talking about?



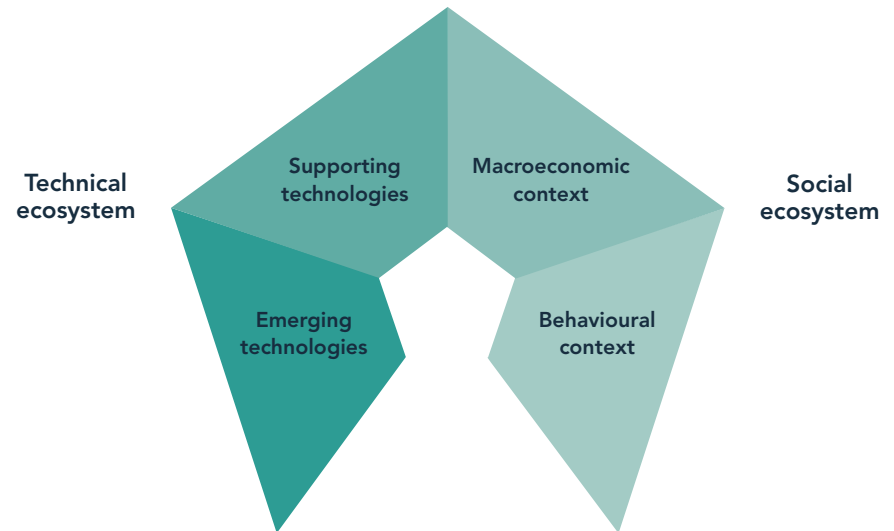
There are all sorts of myths circulating about AI. These myths concern how AI systems work, the consequences of AI and the development of digital technology in general. The WRR identifies and mitigates eight myths about AI. It is believed, for instance, that the technology is always neutral and exhibits rationality. But there are also all kinds of fears, including the fear that AI may become self-conscious and turn against humanity. Excessive optimism and exaggerated fears are not functional. Demystification is important to ensure that the correct questions are asked in the public debate. In other words, society must develop a degree of ‘AI wisdom’.

**Recommendation 1:** Make learning about ai and its application an explicit goal of governmental policy.

**Recommendation 2:** Stimulate the development of ‘AI wisdom’ amongst the general public, beginning by setting up algorithm registers to facilitate public scrutiny.

## Task 2 – Contextualization: How to make it work?

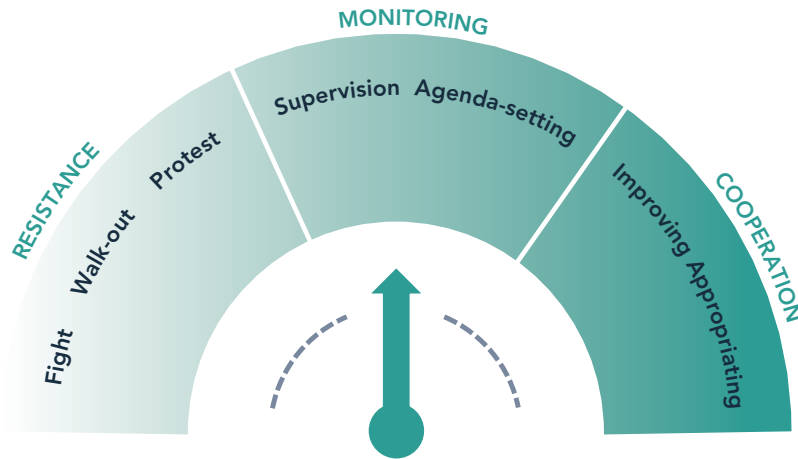
No matter how good the algorithms are, other technologies and an appropriate social context are required to make AI work in practice. This includes telecommunication networks, high quality data, advanced chips and supercomputers. A country can ensure proper embedding in society of AI by choosing an 'AI identity' and focusing on the technical ecosystem required for this purpose. Furthermore, a social ecosystem is also needed. Business processes must be adapted to AI, for instance. But people must also learn how to deal with this new technology on an individual level. These are all complex changes that mean that the proper functioning of a new technology in practice will often take longer than expected.



**Recommendation 3:** Explicitly choose an 'AI identity' and investigate in which domains changes in the technical environment are required to realize this.

**Recommendation 4:** Enhance the skills and critical abilities of individuals working with AI, and establish educational training and forms of certification to qualify people.

## Task 3 – Engagement: Who should be involved?



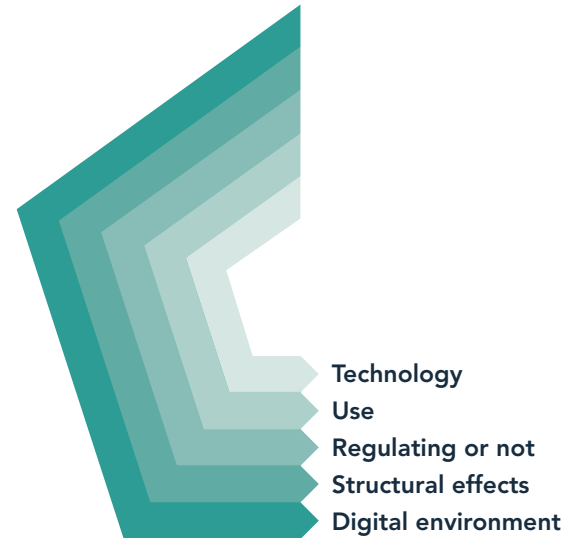
While companies and governments usually have the resources to work with a new system technology, civil society often does not get involved until later. This involvement is very important because it protects the interests and rights of all kinds of groups in society. The different forms of engagement with regard to AI (resistance, monitoring and cooperation) have not yet been equally developed. For example, there is already quite some opposition to autonomous weapons, facial recognition and applications used by police forces. Various organizations also contribute to monitoring AI issues and putting them on the public agenda. However, organizations in civil society are only to a limited extent appropriating AI and using the technology to serve their own goals.

**Recommendation 5:** Strengthen the capacity of organizations in civil society to expand their work to the digital domain, in particular with regard to AI.

**Recommendation 6:** Ensure strong feedback loops between the developers of AI, its users, and the people that experience its consequences.

## Task 4 – Regulation: What kind of framework is necessary?

Regulation can focus on the technology itself, on usage, and on structural effects and the broader digital environment. Regulation currently focuses mainly on the technology and direct use. More attention should be paid to the structural effects of AI such as the steady growth of surveillance and thus the use of data in society, the widening gap between the public and private sectors, and the concentration of power among a small number of companies. Above all, a shift in focus is required from acute issues to the key question about the type of 'digital living environment' we envision.

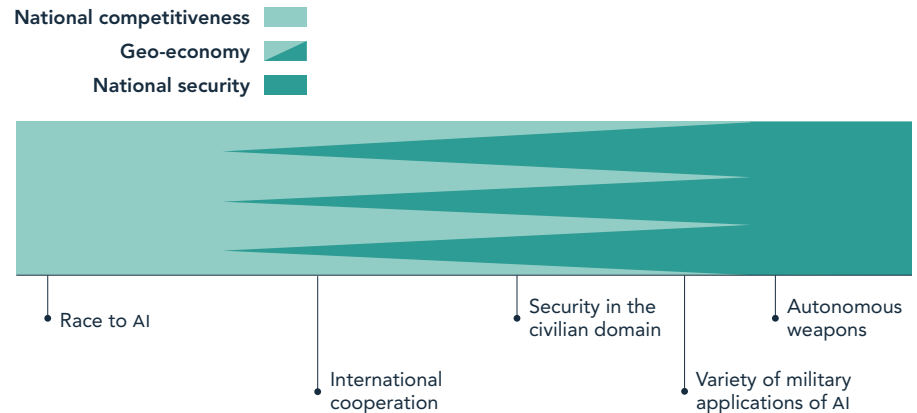


**Recommendation 7:** Connect the regulatory agenda on AI to debates on the principles and organization of the 'digital environment' and develop a broad strategic regulatory agenda.

**Recommendation 8:** Use regulation to actively steer developments of surveillance and data collection, the concentration of power, and the widening gap between the public and private sector in the digital domain.

## Task 5 – Positioning: How to relate globally?

A global AI race seems to be underway as a result of investments and national strategies. Two issues are at stake here: competitiveness and security. These two issues are becoming increasingly intertwined and this also requires attention: geo-economics. Cooperation at the European or international level in research, investment and legislation can strengthen Dutch competitiveness. This requires 'AI diplomacy'. Positioning is also about the security of a country. This applies not only to military security, but also to security in the civilian domain. There is still too little attention being directed towards security threats affecting ordinary citizens such as manipulation, deepfakes and the analysis of public data sources for sensitive information.

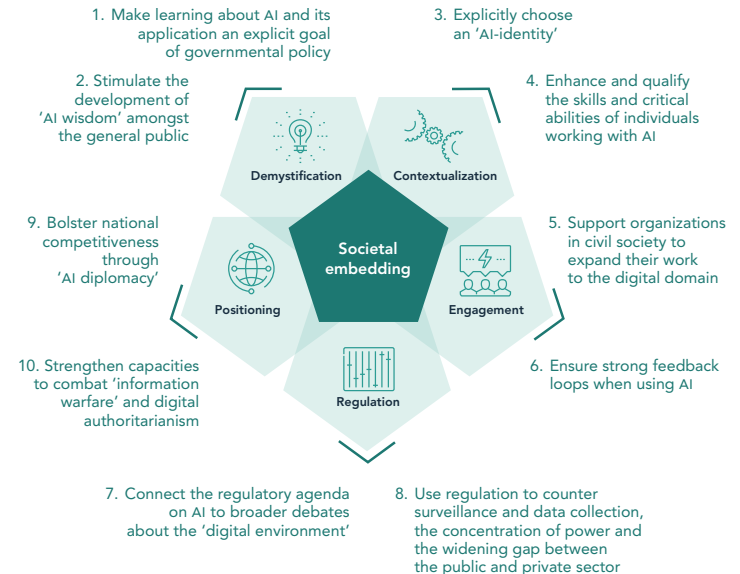


**Recommendation 9:** Bolster national competitiveness through a form of 'AI-diplomacy' that is focused on international cooperation, specifically within the European Union.

**Recommendation 10:** Know how to defend yourself in the AI-era; strengthen national capacities to combat both 'information warfare' and the export of digital authoritarianism.

# Conclusion: An AI-agenda for the government

Based on the five overarching tasks for embedding AI in society, the WRR has ten recommendations for the Dutch government. Over and above these ten recommendations, there is an eleventh recommendation that deals with how the government can implement this policy. All system technologies require a major and long-term effort from the government across a wide area. For this to work well, it is necessary to establish an associated, new policymaking infrastructure, one that is not only administratively but, above all, politically anchored. An important first step to this end is establishing an AI coordination centre. This is important as a knowledge platform for government and beyond, to identify new issues and to contribute to defining other recommendations. Politically, a ministerial subcommittee should be established that includes the coordination centre. These steps can help the Dutch government contribute to embedding AI, the combustion engine of the 21<sup>st</sup> century.



**Final recommendation:** Establish a policymaking infrastructure for AI, starting with an AI coordination centre that is embedded into the political process.

# Mission AI

*AI in pictures*

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This publication belongs to WRR report 105. *Mission AI. The new system technology*. For the substantiation of the conclusions and recommendations presented in this publication, reference is made to the extensive analysis of the policy and the scientific literature contained in that report. The report *Mission AI. The New System Technology* (ISBN: 978-90-832012-3-8) was presented by the council to the government on 11 November 2021.

The report (in Dutch) can be downloaded free of charge from [wrr.nl](http://wrr.nl).

*Mission AI. The New System Technology* (in English) is available via [www.springer.com](http://www.springer.com).

The book is a translation and adaptation of the Dutch report *Opgave AI. De nieuwe systeemtechnologie* published by the Netherlands Scientific Council for Government Policy (WRR) in 2021.

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