Imagining Artificial Intelligence

Uncovering the culturally specific imaginations surrounding AI in the Dutch national AI strategy

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Utrecht, February 2021
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Introduction

Artificial intelligence (AI) is as pervasive as it is elusive. As AI pioneer John McCarthy once lamented: "As soon as it works, no one calls it AI anymore" (Vardi, 2012). The ability of machines to deduct and prove theorems was ground-breaking in the 1960s, but now strikes us as self-evident – and certainly not as 'artificial intelligence'. AI is a notoriously vague concept, about which many people disagree on what to include or not to include (Roberge et al., 2020). By and large, however, people endorse some version of the following definition: "the ability of a digital computer or computer-controlled robot to perform tasks commonly associated with intelligent beings" (Copeland, 1998). To a certain extent, artificial intelligence has become ingrained in daily life. Route scheduling, recommendation systems, medical decision support and face and speech recognition are only some of its applications used on a daily basis. Yet, as with other (re-)emerging technologies, the discourse not so much focusses on what AI *can* do now, but rather what it *could* do in the (near) future (Natale & Ballatore, 2020). Large investments from governments and corporations as well as breakthroughs in techniques such as deep-learning and neural networks further support the idea that AI's greatest impact is yet to come. Though many AI experts believe that artificial intelligence will deeply shape the (near) future of today's society, there is no consensus on whether it will be for better or for worse (Bostrom, 2014; Boyd & Holton, 2018). These diverging expectations are reflected in popular media with future visions ranging from the glooming utopias in books such as Kurzweil's (2005) *The singularity is near* to the dystopian storylines in Netflix's *Black Mirror*. All such imaginations present a particular view of the future, based on different interpretations of what AI is, what it could do and what it should do. Nonetheless, the public debate about AI – or some version of it – is intensifying.

The intensification is also clearly visible in politics and public policy. Governments around the world aim to anticipate and steer AI's potential impacts by drafting up national strategies. The list of countries with national AI strategies has grown tremendously in the last five years and continues to grow (OECD.AI, 2020; Van Roy, 2020). In these strategies, countries outline how they envision the future of artificial intelligence, seeking to maximise the potential benefits they see while simultaneously assessing and addressing the risks AI might present. Not only do these strategies have the potential to deeply influence the embedding of AI in society, but they can also be considered as clear manifestations of distinct imaginations surrounding AI. Indeed, earlier investigations of (re-)emerging technologies such as biotechnology and nanotechnology have shown that the visions and discourses in national technology policies can be highly country-specific (Burri, 2015; Felt, 2015; Felt, Fochler & Winkler, 2010; Frow, 2020; Hurlbut et al., 2020; Jasanoff, 2005b; Jasanoff & Kim, 2013). In the case of nuclear power, for example, the US saw a potential runaway technology that demanded containment while South Korea saw a driver of progress (Jasanoff & Kim, 2009).

Such studies point to cultural differences to explain the country-specific imaginations in technology strategies. Felt's (2015) study of Austria's policies on nuclear power and biotechnology provides a compelling example. In Austria, the regained independence after the post-war Allied occupation and past experiences with the uptake of technologies gradually led to a shared understanding that resistance to 'foreign' technologies is part of being Austrian. Austrians take pride in their success in keeping technologies out through bottom-up contestation. These shared understandings of what it means to be Austrian are reflected in a collectively held vision of a desired future in which freedom, both from 'foreign' technologies as well as political freedom, is the central tenet. Thus, cultural notions of how technologies *ought to be seen* and *ought to be approached* are reflected in technology policies and, consequently, influence how technologies are assessed and embedded in society.

Even though such culturally specific imaginations surrounding technologies are influential to governments' assessments of technologies and their envisioned embedding in society (Kerr et al., 2020; Roberge et al., 2020), these imaginations are often underexamined and hardly ever topics of discussion. This is partly due to insufficient recognition that imaginations are performative – i.e. they *do* something (Beckert, 2016; Borup et al., 2006; Hajer, 2017). A case in point is the discourse on AI that mainly focusses on its potential effects rather than the visions that guide the development and application of this technology (Vicsek, 2020). Also, it is difficult to see what is culturally specific from one vantage point (Jasanoff & Kim, 2009). Consequently, culturally specific imaginations in technology policies often go unnoticed and unchallenged. A case study of a national technology policy that contrasts this policy with other relevant material is particularly well-suited to address this issue. This material – such as related or similar policy documents – offers a relief that helps to identify the distinct imaginations in the national technology policy. Furthermore, a case study allows for an in-depth investigation of the country-specific cultural assumptions underlying these imaginations.

In this study, I investigate the imaginations and the underlying cultural assumptions reflected in the national AI strategy of the Netherlands. In doing so, I aim to both identify the country-specific imaginations surrounding AI and the cultural specificities of the Dutch policy context. National strategies on AI – in contrast to those on biotechnology and nanotechnology – have thus far not been subjected to investigations into the culturally specific imaginations reflected in these strategies. Also, there are few (recent) studies on the cultural – let alone the imaginative – aspect of Dutch technology policies. The current study addresses this gap in literature and contributes to the understanding of the cultural dimension of Dutch technology policies. More generally, this study adds to the growing body of literature showing that imaginations surrounding technologies are never simply a given, nor predetermined or inevitable. These imaginations are the result of a complex and continuous process in which different visions emerge and – through explicit and implicit contestation, deliberation and

promotion – are forgotten, remain marginal or become collectively held understandings of how things ought to be (Jasanoff, 2015). I focus on the latter by identifying the culturally specific imaginations that are reflected in the AI strategy of the Dutch government. In doing so, I subject these imaginations to reflection and critique which in turn will, hopefully, contribute to a more open democratic debate. In other words, uncovering the imaginative and cultural side of the Dutch AI strategy can help to politicise the Dutch assessment of and approach to AI. With that goal in mind, this study seeks to answer the following research question:

> RQ: What imaginations of AI and its embedding in society are reflected in the national AI strategy of the Netherlands – and why these particular imaginations?

The next section gives an introduction into the imaginations surrounding AI and discusses the concepts of sociotechnical imaginaries and technopolitical cultures which I use as investigative lenses. Then I discuss the case study design and describe how I selected and analysed the data. Afterwards, I present the findings and subsequently provide an analysis of these findings. This thesis concludes by answering the research question and reflecting on the implications and limitations of this study.

Theory

Imaginations of artificial intelligence

The notion of artificial intelligence can be traced back to the *Dartmouth Summer Research Project on Artificial Intelligence* in 1956 (Fleck, 1982). This project did not only introduce the concept, but also some of the imaginations surrounding AI – what it is, what it does and what it could do – that can still be identified in today's public and political discourse.

Perhaps the most prominent one is the notion that AI is humanlike (Boyd & Holton, 2018; Bunz, 2019; Natale & Ballatore, 2020). The Dartmouth project's proposal states that "the study is to proceed on the basis of the conjecture that every aspect of learning or any other feature of intelligence can in principle be so precisely described that a machine can be made to simulate it (McCarthy, 2006, p. 12). The proposal thus expresses the believe that, in principle, AI-driven machines can 'think' and act like humans. This promise of a 'thinking machine' has persisted throughout the years and led to hype cycles in which great expectations were followed by unfulfilled promises and a loss of credibility and funding (Natale & Ballatore, 2020). In recent years, the belief in a thinking machine has resurfaced and is mutually reinforced by large investments and technical breakthroughs (Kerr et

al., 2020). The general public has also become accustomed to this imagination through depictions of humanlike AI, such as the sentient robot in the science-fiction film *Ex Machina*.

Another pervasive and resurfacing imagination surrounding AI is that it works like magic (Elish & boyd, 2018). AI-driven systems are envisioned as operating seamlessly and in a way that is both impressive and unknowable. Recent advancements in machine learning techniques reinforce this notion through the development of AI-systems that operate in ways that even experts cannot comprehend (Burrell, 2016). Also, to 'work like magic' connotates that it is "costless in terms of the kind of drudgery, hazards, and investments that actual technical activity inevitably requires. Production 'by magic' is production minus the disadvantageous side-effects, such as struggle, effort, etc." (Gell, 1988, p. 9). Unsurprisingly, the image of AI working like magic is often used in the marketing of AI (Elish & boyd, 2018).

The imagination of a humanlike thinking machine that operates magically is not only persistent and pervasive, but also reflects an inaccurate understanding of how AI works. For instance, an AI-driven face detector does not *know* what a face is in the same way as humans do (Elish & boyd, 2018). Rather, it is more accurately described as a 'set-of-pixel-values-that-often-correlate-well-with-the-presence-of-faces-in-the-training-data-that-you-collected-detector' (Smart, 2016). Broadly speaking, AI operates by "[analysing] large data sets to extract potentially interesting and useful patterns" (Kelleher & Tierney, 2018, p. 15). Furthermore, far from working seamlessly and being costless, AI systems often suffer from missing, inaccurate or biased data and require humans to make choices on how to articulate categories, design the algorithms, train the datasets and interpret the outputs (Elish & boyd, 2018). The hyped imaginations of what AI is and can do thus do not correspond with its current capabilities (Kerr et al., 2020). Elish and boyd (2018) also note that "Ps like personalization, precision, and prediction are goals that motivate and drive [the work of computer scientists], not accurate depictions of the state of the art" (p. 68).

The hyped imaginations persist in spite of the discrepancy with the current state of the art because the discourse on AI focusses less on what it *is* or *can do* now and more on what it *could be* or *could do* in the foreseeable future (Boyd & Holton, 2018; Elish & boyd, 2018; Natale & Ballatore, 2020). Kerr and her colleagues (2020) found that even AI-savvy respondents most frequently associate AI with self-driving cars and robots even though they experience AI on a daily basis in recommendation systems and face and speech recognition. Another striking example is the CBS' (2015) news segment on the DARPA robotics challenge. CBS did not only invite an MIT professor to comment on the world's most prestigious robotics challenge, but also interviewed the director of the science-fiction film *Ex Machina*. This orientation on the future is further sustained by the belief that current shortcomings and limitations will shortly be overcome (Natale & Ballatore, 2020).

However, the future is inherently uncertain. Selin (2008) aptly states that "the ontological indeterminacy of the future means that it is not possible to know the future because we are always actively creating and re-creating multiple futures, any one of which may (or may not) actually emerge" (p. 1888). Visions of what AI *is* or *can do* and what it *could be* or *could do* contribute to the creation of futures by making some conceivable while other possible futures remain out of sight (Borup et al., 2006; Vicsek, 2020). The conceived futures provide reference points for action and, as such, can 'materialise' into national technology policies (Veenman et al., 2019). In this study, I draw on the concept of sociotechnical imaginaries to understand how imaginations can materialise and to identify the culturally specific imaginations in the Dutch national AI strategy.

Sociotechnical imaginaries

The importance of addressing the culturally specific imaginations reflected in technology policies has been widely shown, most potently in science and technology studies. Jasanoff and Kim's (2015) *Dreamscapes of Modernity* provides a particularly potent series of examples of the cultural aspect of technological development. Not only does this book feature various case studies into country-specific imaginations of technologies and their embedding in society, but it also presents the concept of sociotechnical imaginaries (STIs) and shows how STIs can be used as lens to identify and analyse these imaginations. Sociotechnical imaginaries are defined as "collectively held, institutionally stabilized, and publicly performed visions of desirable futures, animated by shared understandings of forms of social life and social order attainable through, and supportive of, advances in science and technology" (p. 4). As a theoretical and investigative lens, the concept deepens our understanding of how and why national technological trajectories emerge and develop over time. Moreover, STIs make visible the culturally divergent roles of science and technology in societies. As science and technology are central drivers of modern societies, such investigations can concern major developments such as nation-building in South Africa (Storey, 2015), the uptake of biotechnology in China's rice production (Chen, 2015) and Austria's resistance to nuclear energy (Felt, 2015).

There are, to the best of my knowledge, no studies to date that examine national AI policies through the lens of STIs. However, the concept does lend itself well for that kind of research. National policy documents on AI – and national strategies in particular – outline a nation's negotiated vision of a desired future and how AI contributes to and fits in this future. National strategies also reflect notions of how social life and social order ought to be in the way countries assess and anticipate AI's potential disruptive societal impact. For instance, only those aspects of social life and social order that are valued in a country are potentially considered as being 'under threat' in the national strategies. In a similar vein, AI offers 'opportunities' to address the aspects that are deemed undesirable. Valerie Burri's (2015) investigation of the differences between the uptake of nanotechnology in Germany

and the United States is an excellent example of how STIs can be used to identify and analyse the imaginations and underlying normative assumptions in national strategies.

Burri (2015) studied how nanotechnology assessment and governance strategies are shaped by the respective national sociotechnical imaginaries of Germany and the US. More specifically, she analysed the national strategies to uncover how the countries envision nanotechnology, a desired future with nanotechnology and the governance strategies for attaining this future. She also substantiated and deepened her analysis by drawing on insights into the nations' cultural characteristics, i.e. the normative assumptions about how technologies ought to be assessed and approached. The analysis revealed that Germany's imaginary has a political core. Besides using nanotechnology for economic gain, Germany also seeks to attain a future in which the dialogue between state and society is strengthened. Consequently, the strategy does not want to pre-empt a certain vision on nanotechnology. Positive and negative expectations are also equally weighted to leave room for discussion. The envisioned discussion takes place between the government, scientific institutions and society at large to ensure the legitimacy of policy decisions. The US' national strategy, on the other hand, reflects an imaginary that focusses on economic gain. Nanotechnology is envisioned as a resource that could (and should) be exploited. The strategy accordingly stresses the potential benefits of the technology and downplays the risks to 'sell' the exploitation of nanotechnology. In the envisioned governance strategy, different actors work separately to attain this future. The scientific community is in charge of maintaining the scientific and economic leadership position of the US and receives (mainly financial) support from the government to do so. Citizens are considered mere customers of the new or improved products that are believed to eventually find their way to society.

Burri's (2015) investigation is particularly useful for this study as it offers examples of how to study the imaginations and underlying normative assumptions in a national technology strategy through the lens of STIs. Furthermore, the discourse on nanotechnology shows many resemblances with AI. Both are considered key technologies with the potential to have a major societal impact in the (near) future. Also, there is no consensus on whether the technology will ultimately change society for better or for worse (Bostrom, 2014; Burri, 2015; Natale & Ballatore, 2020). The critics warn that these technologies can be used to 'play God' and thereby challenge conventional ideas of what it means to be human (Gaskell et al., 2015; Kerr et al. 2020). The proponents, on the other hand, point to the societal and economic opportunities that these technologies offer. The uncertainty surrounding the impact of these technologies make them – even more so than other technologies – prone to culturally distinct notions of how these technologies ought to be assessed and embedded in society. Thus, Burri's approach offers a promising theoretical and methodological template for the current study in which the search for imaginations of AI, a desired future with AI and the governance

strategies for attaining this future guides the analysis of the Dutch national AI strategy. Furthermore, the analysis of the current study is substantiated and deepened with insights into the cultural notions of how technologies *ought to be* seen and *ought to be* approached – which will be further discussed in the next section. Burri's approach allows us to specify our investigation with three sub-questions:

SQ1: What imaginations of AI are reflected in the Dutch AI strategy?
SQ2: What imaginations of a desired future with AI are reflected in the Dutch AI strategy?
SQ3: What are the envisioned governance strategies to attain this desired future in the Dutch AI strategy?

To make sure that the methodological approach is attuned to the context of AI, a slight alteration needs to be made. Burri (2015) discerned four dimensions of sociotechnical imaginaries: (i) the assessment of the risks and benefits of the technology and (ii) the envisioned role of science, (iii) citizens and (iv) government. The second dimension (i.e. the role of science) does not quite cover the field of AI research. The term 'science' hints towards academic research while the private sector accounts for a much of the research activities into AI (Walch, 2020). Research conducted by contract research organisations, tech companies and start-ups are an important driver behind AI development. The Dutch government acknowledges this in their AI strategy in stating that "the Netherlands must facilitate AI, so that companies can keep their research and innovation in (and bring it to) the Netherlands" (MEACP, 2019a, p. 10). Thus, the national AI strategy does not outline a single vision on the role of academic research, but rather one on the role of research and development in general. This study will therefore refer to the second dimension as 'the role of research and development'.

Technopolitical cultures

Burri (2015) did not only identify the imaginations reflected in the national strategies, but also sought to understand why these particular imaginations were identified. To do so, she used insights into the nations' collective understandings of how technologies *ought to be* seen and *ought to be* approached. Uncovering this cultural dimension helps to explain the country-specific features of a certain sociotechnical imaginary. In other words, it shows that the imaginations reflected in a national technology strategy are not coincidental but rather reflect deeply rooted cultural notions of desired ways of living and ordering (Jasanoff, 2015). These culturally specific notions – which are often deeply ingrained in society – then become subject to reflection and critique which in turn adds to and deepens the political and public debate on how technologies should be assessed and approached (Vicsek, 2020). Following the example of Burri (2015), I aim to uncover the cultural notions underlying the imaginations reflected in the Dutch national AI strategy. This section further discusses

how culture finds its way into national technology strategies and does so by drawing on the concept of technopolitical cultures.

The concept of technopolitical cultures draws attention to "the coevolution of the political and the technological, implying that there may be cultural differences in the form the coevolution of technology and society takes, depending on the social structures, value systems, and cultural rituals technologies coevolve with" (Felt et al., 2010, p. 527). In other words, culture and technological development are not considered separate but rather inextricably linked. This "co-productionist perspective" (Pfotenhauer & Jasanoff, 2017, p. 786) is employed in an increasing number of articles from within the field of science and technology studies that investigate country-specific technological trajectories (e.g. Cloke et al., 2017; Delina, 2018; Hansen et al., 2018; Hurlbut et al., 2020; Kuchler & Bridge, 2018; Longhurst & Chilvers, 2019). Felt's (2015) analysis of Austria's collectively shared value of political freedom and its resistance to 'foreign' nuclear power and biotechnology provides a case in point. In short, the concept of technopolitical cultures helps to clarify what the cultural dimension of sociotechnical imaginaries entails. More specifically, the concept points out two ways in which cultural aspects shape technology policies (Felt et al., 2010; Felt & Müller, 2011).

First, culture shapes technology policies on an epistemic level as country-specific norms, values, beliefs and attitudes shape the way in which technological development – or the development of AI in particular – is understood (Felt & Müller, 2011). In the words of Jasanoff (2005a), these cultural aspects constitute the culturally distinct 'knowledge-ways' in which technologies are assessed and approached. These tacit knowledge-ways entail the perspectives on and claims about a technology such as AI that are considered rational, legitimate and robust. For example, Burri (2015) argues that the emphasis on dialogue in Germany's nanotechnology strategy stems from earlier experiences with the uptake of biotechnology that had led to heated public and political debates. Nanotechnology was therefore understood as a 'potential politically sensitive technology' that called for deliberation to avoid public unrest.

Culture also influences technology policies on a systemic level – in what Hecht (2001) has called 'technopolitical regimes'. These regimes "are grounded in institutions, and they consist of linked sets of people, engineering, industrial practices, technological artifacts, political programs, and institutional ideologies which acts together to govern technological development" (p. 257). Institutions are set up in culturally distinct ways in terms of the people, goals, interests, practices and ideologies involved. The same goes for the way in which different institutions relate to each other. For instance, Burri (2015) found that different actors have relatively clear delineated roles in the technology policies of the US. The particular relation between science and the government is reflected in Vannevar Bush's (1945) influential report to former US president Franklin D. Roosevelt entitled *Science: The Endless Frontier* – a report that tapped into the American cultural tradition of

exploration and expansion. Bush argued that science could flourish and provide an endless stream of economic and other benefits if only the government would respect the separation between politics and science and keep financing basic research (Guston, 2000). At the end of the imagined pipeline are the citizens who are considered to be the (future) customers (Burri, 2015).

The concept of technopolitical cultures thus refers to both the epistemic level and the systemic level on which culture matters for the development and embedding of technologies. The former focusses on the knowledge-ways through which a technology is assessed and approached while the latter points out the systemic ways in which culture becomes grounded in and performed by (the interplay of) institutions. However, the two levels should not be understood as separated but rather inextricably linked (Felt & Müller, 2011). Jasanoff (2004) aptly notes that "the ways in which we know and represent the world […] are inseparable from the ways in which we choose to live in it" (p. 2).

To conclude, Burri (2015) shows that the distinct sociotechnical imaginaries of Germany and the US are rooted in country-specific technopolitical cultures. The present study aims to do the same by identifying the Dutch technopolitical culture to further substantiate and deepen the understanding of the imaginations surrounding AI. Here I arrive at the fourth and final sub-question:

SQ4: How do these imaginations reflect the Dutch technopolitical culture?

Methods

I commence this chapter by discussing the case study design and overall methodological approach of this study, which includes a systematic literature review. Then I describe the case as well as (the selection procedure of) the additional material and peer-reviewed articles. Lastly, I discuss how I analysed the case, the additional material and the peer-reviewed articles in order to answer the research question.

Design

In this study, I use a case study design and an idiographic approach to answer the research question. This entails a "detailed and intensive study of a single case" (Bryman, 2016, p. 60) to "reveal the unique features of [that] case" (p. 61). The case at hand is the Strategic Action Plan for Artificial Intelligence (SAPAI; MEACP, 2019a) that outlines 'the overarching AI-approach of [the Dutch] cabinet' (Ollongren, 2019, p. 1). I investigate the SAPAI to gain insight into the culturally specific imaginations surrounding AI of the Dutch government. A case study design is particularly well-suited

for this kind of research for two reasons. First, this design focuses on a single unit and thus chooses depth (which is essential in this study) over breadth (Flyvbjerg, 2006). Second, the in-depth analysis of a single case allows for a detailed description of the culturally specific imaginations surrounding AI (Gerring, 2004).

However, I do not solely focus on the SAPAI to answer the research question. Flyvbjerg (2006) argues that "good social science is problem-driven and not methodology-driven, in the sense that it employs those methods which for a given problem best help answer the research questions at hand" (p. 26-27). The four sub-questions pose different challenges that necessitate the use of additional data.

The main challenge concerning the first three sub-questions lies in uncovering the imaginations surrounding AI that are reflected in the SAPAI as it is difficult to discern what is culturally specific from one vantage point (Jasanoff & Kim, 2009). Jasanoff (2015, p. 24) argues that comparison is "perhaps the most indispensable method" to uncover imaginaries. Indeed, comparing the SAPAI with other relevant material helps to discern the particularities of the imaginations in the strategy by offering contrasting examples. First, a cross-country comparison helps to identify imaginations in the SAPAI by contrasting these imaginations with those reflected in another country's national AI strategy. I have chosen to contrast the SAPAI with the US' national AI strategy. In doing so, I follow the example of previous studies that contrast the technology policies on emerging technologies of the US with those of European countries, such as Germany and the UK (Burri, 2015; Frow, 2020; Hurlbut et al., 2020; Jasanoff, 2005b; Jasanoff & Kim, 2013). Even though the US and these European countries share similar characteristics (e.g. largely capitalist, technology-driven, liberal and democratic), these studies found that the US is a valuable contrasting case because its assessments of and approaches to emerging technologies can differ significantly from those of European countries. For instance, Jasanoff (2005b) compared the regulation of biotechnology in the Germany and the US and found that the German government is especially attentive to the possible risks of this technology and is therefore "exceptionally resistant to the idea of ungoverned or ungovernable spaces and to categories that defy the controlling capacity of the law" (p. 153). The US, on the other hand, envisions that biotechnology will lead to "a stream of products […] that the market is best positioned to deliver and regulate" (p. 152).

Second, contrasting the SAPAI with related material sheds light on the national political debate surrounding AI and the SAPAI both before and after the document was published. This debate elucidates the standpoints from various actors and political parties which can then be compared to the SAPAI to gain insight into the standpoint from which the strategy is written. For example, comparing the views in the SAPAI to those from various actors and political parties reveals which actors and parties hold similar views and who opposes the views in the strategy. Also, investigating the policy documents leading up to the SAPAI reveals how visions on AI, a desired future with AI and

governance strategies for attaining this future changed over time in the Dutch policy domain and how it eventually took shape in the SAPAI. Not only does this point out which visions were sustained, but also those that were, either deliberately or not, left out of the national AI strategy.

Lastly, the main challenge related to the fourth sub-question lies in gaining an understanding of the Dutch technopolitical culture. I therefore conduct a systematic literature review to identify articles that provide insight into the Dutch technopolitical culture.

Data

The Strategic Action Plan for Artificial Intelligence

The SAPAI is presented as the 'the overarching AI-approach of [the Dutch] cabinet' (Ollongren, 2019, p. 1). As such, it is a highly informative document to study the Dutch imaginations of AI and its embedding in society. The strategy was published and sent to the House of Representatives by the Minister of Economic Affairs and Climate Policy on October 8, 2019. The document outlines the government's assessment of and approach to AI in 64 pages and its main message is summarised in the following statement: "the Netherlands is able to capitalise on AI's societal and economic opportunities, as well as to safeguard the public interests of AI, thus contributing to prosperity and well-being" (MEACP, 2019a, p. 6). Three tracks and two appendices – one with an overview of proposed measures and one with a financial overview – elaborate on this key message. The three tracks are: (1) exploiting societal and economic opportunities, (2) creating the right conditions and (3) strengthening the foundations (i.e. public values, trust, fairness and safety). The SAPAI was created in close collaboration with the Taskforce AI that mainly represents private parties and is chaired by the director of the Dutch employers' organisation (MEACP, 2019a, p. 10; Taskforce AI, 2019, p. 22). Furthermore, the position paper 'Algorithms that work for everybody' (Taskforce AI, 2019) and the report 'AI for the Netherlands' (AINED, 2018) are mentioned as "important building blocks" (p. 10) for the strategy. The public-private partnership AINED has now largely been absorbed by the currently active AI-Coalition "in which companies, government agencies, knowledge institutions and educational institutions join forces to implement new AI actions that help specific domains and sectors" (MEACP, 2019a, p. 7).

Additional material

The SAPAI's American counterpart, the American National Artificial Intelligence Research and Development Strategic Plan (NAISP; SCAI, 2019), was published in June 2019 and is part of the broader American AI Initiative that was launched six months prior to the strategic plan. The initiative started with a six-page Executive Order that briefly outlines the US' national AI strategy. To date, the NAISP is the only official publication from the federal government that elaborates on this nation-

wide strategic approach to AI. The strategy outlines eight priority areas for federal investment in AI research and development for the purposes of "maintaining American leadership in AI and ensuring that AI benefits the American people and reflects our Nation's values" (p. i). This document is an updated version from a national AI strategy published in 2016. The main difference is the addition of the eighth priority area that calls for more public-private partnerships.

I derived the related material from the references in the SAPAI and two governmental websites.[1] I initially scanned all references in the SAPAI and fully read them if the document provided insight into the Dutch vision on or approach to emerging technologies in general or artificial intelligence in particular. Taking into account the Dutch vision on and approach to emerging technologies made it possible to see how the national AI strategy fits in with more general innovation policies. To see, for example, if the SAPAI shares the same views or holds opposing views on aspects such as the approach to risks or the role of citizens. Secondly, I searched two governmental websites with the keywords "SAPAI" and "*Strategisch Actieplan voor Artificiële Intelligentie*" to find material on the debate surrounding the document. These searches yielded 67 results of which I excluded most because these documents and meetings only refer to the SAPAI once or incidentally and thus provide little to no insight into the debate surrounding the SAPAI. Lastly, I checked the references of each selected document to spot relevant material that had thus far gone unnoticed. These searches ultimately led to the selection of seventeen documents, three parliamentary committee meetings and one plenary debate in the House of Representatives (see Appendix A).

Peer-review articles

I based the literature search on the 'Preferred Reporting Items for Systematic reviews and Meta-Analysis' (PRISMA) flow diagram to provide transparency in the followed procedure (Moher et al., 2009). An overview of the process is depicted in Figure 1 below.

I used the following search string in October 2020 to search the title, abstract and keywords of all peer-reviewed articles in Web of Science: ("cultur*" OR "politic") AND "technolog*" AND "Netherlands". I only searched for articles that are written in Dutch or English. The search yielded 212 results of which ten were removed due to inaccessibility. Then I assessed the eligibility of the articles by checking the titles and abstracts and, if necessary, the full text. I excluded a total number of 186 articles because these articles either (i) discuss technology, culture/politics and the Netherlands separately as opposed to in relation to each other or (ii) address the Dutch case or the cultural/political dimension to a negligible extent because it is but one of the multiple countries or dimensions,

[1] https://www.officielebekendmakingen.nl/ and https://debatgemist.tweedekamer.nl/

respectively. Lastly, I checked the references of the remaining 16 articles for other relevant articles which led to the inclusion of three more articles. Thus, I included a total of 19 articles in the analysis.

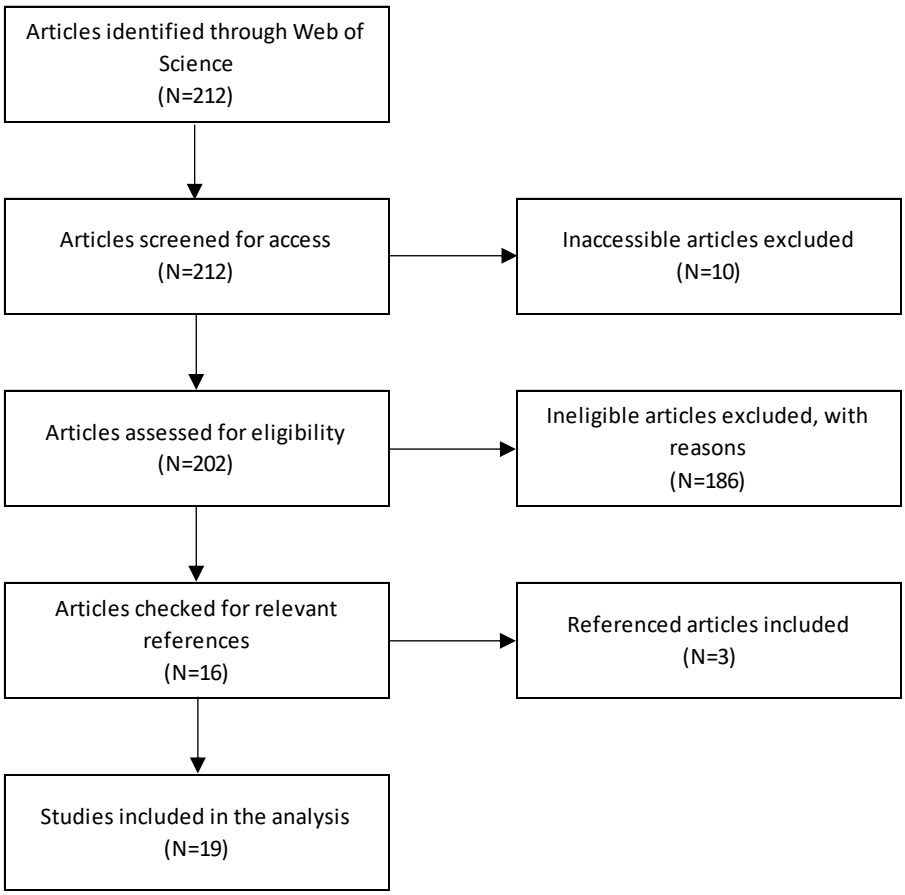

Figure 1. PRISMA flow diagram

Analysis

Document analysis

I analysed the SAPAI by identifying and comparing recurring discursive elements in the strategy as "language is a crucially important medium for the construction of imaginaries" (Jasanoff & Kim, 2009, p. 122). I coded the strategy using the coding process outlined by Boeije (2010) that is inspired by the grounded theory approach. She outlines three consecutive coding phases in which the data is systematically analysed to develop a theory that is grounded in the data. Rather than aiming for a theory, I tried to identify a sociotechnical imaginary surrounding AI that is derived from and supported by the data. I used NVivo 12 to code and analyse the SAPAI.

The first phase entailed a close reading of the document during which I broke down the strategy into text fragments and coded each fragment that in some way related to the first three sub-questions of this study. This process resulted in 279 distinct codes that provided a first insight into the visions reflected in the strategy. During the next phase, I reassembled the codes into categories and

subcategories. The dimensions derived from Burri's (2015) study – i.e. risks and benefits of AI and the role of research and development, citizens and the government – provided a point of departure in the form of preliminary categories. After finding that the preliminary categories were sufficiently grounded in the data, I reassembled the remaining codes into categories while going back and forth between the list of categories, the codes and the data. This process eventually resulted in eight main categories that each correspond to one of the first three sub-questions. Besides the initial four categories, I identified the following categories: 'Nature of AI', 'Future state with AI', 'Role of companies' and 'Cooperation'. I discuss the eight main categories separately in the next chapter.

During the coding process, I also wrote down preliminary ideas about what the categories revealed about the imaginations surrounding AI reflected in the strategy. I developed, revised, replaced and added to these ideas as I viewed the parliamentary meetings and read the US' national AI strategy and additional documents from the Dutch policy domain. I also revisited the SAPAI regularly to check if the findings and inferences were sufficiently grounded in the data. After the additional material was exhausted and I found strong support in the strategy, I settled on the results and conclusions discussed in the next chapters.

Literature review

I analysed the selected articles to identify the characteristics of the Dutch technopolitical culture. This analysis started with a close reading of each article during which two characteristics immediately stood out. These characteristics are discussed in most of the articles and often explicitly mentioned as lying at the core of the Dutch (technopolitical) culture: pragmatism and the 'polder culture'. The notion that these categories are most important gained further support after I found that most of the remaining insights from the articles could be clearly linked to either pragmatism or the polder culture. The few insights that were not related to these characteristics did not reveal a third core characteristic. I therefore decided to stick with the two core characteristics in order to base my analysis on a substantiated *general* understanding of the Dutch technopolitical culture rather than a detailed but less substantiated one. This is sufficient for the purposes of this study because the understanding of the Dutch technopolitical culture is only used to (i) show the cultural embeddedness (and thus the contingency) of the Dutch national AI strategy and (ii) provide a deeper understanding of the imaginations found in the SAPAI.

Findings

In this section, I discuss the results from the document analysis and the systematic literature review. First, I discuss the main categories that emerged from the coding process while staying close to the content of the SAPAI. In the subsequent analysis I draw more heavily on the additional material to interpret the findings. Taken together this will give insight into the Dutch vision on AI, a desired future with AI and the governance strategies for attaining this future (SQ1-SQ3). Then I discuss and subsequently analyse the identified main characteristics of the Dutch technopolitical culture that resulted from the literature review. Lastly, I compare the identified main characteristics with the findings from the document analysis to see how the characteristics of the Dutch technopolitical culture are reflected in the strategy's imaginations (SQ4).

Imaginations in the Dutch national AI strategy

Nature of AI

The SAPAI uses the definition of the European Commission in which "AI refers to systems that display intelligent behaviour by analysing their environment and taking actions – with some degree of autonomy – to achieve specific goals" (MEACP, 2019a, p. 9). The Dutch government had critiqued an earlier definition of the European Commission for depicting AI as a 'humanlike' technology:

> "This definition assigns technology in a way that could be misleading: nobody talks about a thermometer "perceiving" temperature, although it "decides" very clever "how many degrees it is" based on "what it perceives". Just like a thermometer an autonomous car, robot or character recognition device does not perceive anything. The machines are configured (not "trained") to map input on a predefined output: turn the steering wheel, initiate or stop a process or output something." (MIKR & MEACP, 2019, p. 2).

The Dutch government thus favoured a more instrumental view on AI. This instrumental view is also illustrated in the SAPAI with frequent references to AI as something to be 'applied' (*toepassen*) and 'used' (*inzetten*). For example, in the area of mobility, "AI can be *applied* at the level of the engine, the vehicle and the driver (and the interaction between them), all road users, the supply chain, the traffic and transport system and the environment [emphasis added]" (MEACP, 2019a, p. 17). The SAPAI further mentions that "AI is also increasingly being *used* to better visualise purchasing and consumption behaviour [emphasis added]" (p. 17). The instrumental view becomes clearer when the SAPAI is compared to the NAISP that does refer to AI as a humanlike technology. The US' national AI strategy states, for example, that "the walls between humans and AI systems are slowly beginning to erode" (p. 5) and that AI systems can function as "intelligent assistants" (p. 11). Similar expressions of AI as a humanlike technology are not found in the SAPAI. Also, unlike the NAISP (see e.g. SCAI,

2019, p. 4-5, 8, 15, 24), the Dutch national strategy does not repeatedly emphasise the complexity of AI systems nor does it discuss features that are difficult to grasp such as machine learning or neural networks. The SAPAI only mentions once that "AI systems are complex and consist of – in short – hardware, software and data" (MEACP, 2019a, p. 49) but does not further discuss the technical features.

Besides viewing AI as a relatively simple instrument, the SAPAI states that AI is "a key technology that is transforming our world" (MEACP, 2019a, p. 9). The strategy generally presents this impact of AI as inevitable. For example, the summary notes that "AI *will* make a substantial contribution to economic growth, prosperity and well-being of the Netherlands. It *will* also be of huge assistance in dealing with societal issues in areas such as ageing, climate change, food safety and healthcare [emphasis added]" (p. 7). This quote also points to the belief that AI "can be applied in almost all domains and sectors" (p. 9) and therefore has a "huge societal and economic potential" (p. 9). The idea that AI is a very promising technology is ubiquitous in the SAPAI. The header of the summary, for instance, is titled "Artificial intelligence is the key technology for societal and economic opportunities" (p. 5).

In summary, the SAPAI presents AI as a transformative and relatively simple instrument that will most certainly be developed and utilised and offers numerous economic benefits and solutions to societal problems.

Benefits and risks of AI

The image of AI as a very promising instrument is further supported by many examples of (potential) benefits of AI. Those examples are mainly outlined in the first track titled 'Capitalising on societal and economic opportunities'. Regarding societal opportunities, the SAPAI states that "AI can contribute to solving societal challenges in all sorts of areas such as safety, healthcare, agriculture and food, energy transition and sustainability" (MEACP, 2019a, p. 15). From an economic point of view, "AI offers enormous opportunities for service and technology companies, for example helping them increase productivity, set up flexible production systems and provide customised solutions" (p. 22). The SAPAI further mentions that AI does not only increase effectivity and efficiency but also "makes companies more competitive, more future-proof and strengthens the competitive position of the country as a whole" (p. 22).

Furthermore, there are far more positive references (e.g. chance, contribution and solution) to AI than negative references (e.g. risk, vulnerability and threat) in the SAPAI. The third track, which discusses the risks and concerns related to AI, also does not refer to AI in a negative way but is titled 'Strengthening the foundations' (i.e. public values, trustworthy AI, open and competitive markets and safety). In the relatively few cases that a negative reference is made, it almost always relates to AI-

applications or data, rather than to AI itself. For example, the SAPAI mentions that "the increasing use of AI technologies is creating new types of vulnerabilities and security threats" (MEACP, 2019a, p. 50) and "the prohibition of discrimination can be violated by bias in the underlying data" (p. 41).

The disbalance between the positive and negative references to AI is striking when the SAPAI is compared to the parliamentary letter 'AI, public values and human rights' (Ollongren, 2019) that was sent to Dutch House of Representatives together with the national strategy. This letter is intended to further elaborate on the third track of the SAPAI and pays particular attention to the concerns related to public values and human rights. The parliamentary letter differs significantly from the SAPAI with, among other things, an overview of the most prominent risks identified in literature (p. 3-4), mentioning of dilemma's and trade-offs (p. 3) and the attribution of potential negative effects (viz. infringement of human rights) to AI itself (p. 2). Such an elaborate discussion of the risks and concerns related to AI is absent in the SAPAI.

Future state

Unlike the US' national AI strategy (SCAI, 2019) that stresses the importance of keeping up with the rapid development of AI itself (see e.g. p. 5, 17, 33), the SAPAI is more outward-looking and concerned with keeping up with the development and application of AI in other countries. The Dutch national AI strategy (MEACP, 2019a) positions the Netherlands amidst a "globally competitive economy" (p. 7) in which "other countries are also investing heavily in AI" (p. 10) and therefore "the Netherlands must facilitate AI so that companies can keep their research and development in (and bring it to) the Netherlands" (p. 10). The strategy further notes that in the globally competitive economy "a 'winner-takes-all' or 'winner-takes-most' dynamic can arise, with a real chance that the Netherlands will become dependent on other parties" (p. 10). This dependency on other countries "could potentially damage [the nation's] economic security, [the nation's] autonomy and [the nation's] well-being" (p. 10). For example, AI could be used to implement cartel agreements which could lead to "autonomous algorithmic cartels" (p. 47) in the future. Therefore, "if the Netherlands and Europe wish to be at the forefront of a globally competitive economy, [the Dutch] must accelerate the development and application of AI in the Netherlands" (p. 7). This should happen rather sooner than later as "there is no time to waste" (p. 7).

The national AI strategy does outline some potential threats if the Netherlands fails to accelerate AI development and application, but it does not present a vision on what it would entail to be a 'winner'. The SAPAI (MEACP, 2019a) only hints towards, among other things, having a competent workforce (p. 25), open and competitive markets (p. 40), trustworthy human-centric AI (p. 27), proportionate ethical and legal frameworks (p. 43) and being internationally profiled in the area of AI development and application (p. 7).

Role of companies

The SAPAI outlines a pivotal role for companies in furthering the development and application of AI. The strategy's summary states that "[companies] will determine whether the Netherlands leads the way in AI or ends up following other countries in this area, and whether AI applications will really benefit the Dutch economy and Dutch society" (MEACP, 2019a, p. 7). Similarly the SAPAI later argues that "it is ultimately the companies (from start-ups and scale-ups to SMEs and large companies), with their innovative and competitive strengths, that make the difference" (p. 15). Many of the strategy's action points are accordingly directed towards supporting companies to develop and apply AI. Investments in education, for instance, virtually all aim at educating more AI-savvy employees for companies (see p. 56-57).

The central role of companies is also illustrated in the important role of the private sector, and the Dutch employers' organisation VNO-NCW in particular, in the drafting of the SAPAI. The VNO-NCW, together with mainly private parties, drafted the two reports that are mentioned as the "building blocks" (p. 10) of the strategy. These reports reflect similar imaginations to those found in the SAPAI. For example, the report '*AI voor Nederland'* (AINED, 2018) depicts AI as an "enabling technology" (p. 1) that "*will* impact the whole economy [emphasis added]" (p. 3) and "*will* have a great positive societal impact [emphasis added]" (p. 3). Furthermore, the report notes that "a winner-take-all scenario is realistic" (p. 4) and that "the question how long Dutch companies are still owner of their core processes is an existential one" (p. 4). The private sector is also closely involved in the AI Coalition that plays a central role in implementing the strategy (MEACP, 2019a, p. 7; PCEACP, 2020b).

Role of the government

The government's main role lies in the stimulation of and investment in AI development and application. It does so by funding research (MEACP, 2019a, p. 61), initiating public-private partnerships (p. 10), applying AI in public services (p. 19) and creating the right conditions for acceleration (p. 25). The latter entails improving the quality of research and innovation, providing training opportunities, stimulating data sharing and improving connectivity.

Besides that, the government is tasked with regulating the risks of AI (MEACP, 2019a, p. 39). The SAPAI states that "the necessary legislation and regulations are already in force or in the making" (p. 7). To the extent that new legislation is necessary, the strategy emphasises the importance of proportionality (e.g. p. 15, 41, 43). This attitude of restraint towards legislation is further illustrated in the Dutch response to the EU's Coordinated Plan on Artificial Intelligence. In a response to the EU-framework regarding safety and liability, it is stated that 'the cabinet wants legislation and regulations to not impose unnecessary restrictions on innovation' (Blok, 2019a, p. 8).

Role of citizens

Similar to the US' NAISP (SCAI, 2019), the Dutch national AI strategy hardly mentions citizens. The SAPAI refers to citizens as recipients and customers who need to trust AI because "[trust of citizens] is necessary for the successful development and application of AI" (MEACP, 2019a, p. 43). The SAPAI mentions that it does not take this trust for granted as "research shows that citizens and business see all kinds of opportunities for AI […], but also have many doubts about the admissibility of some AI applications" (p. 43). The document goes on to state that "in order to maintain trust in AI, it is crucial that AI is people-oriented and that it is deployed in such a way that it contributes to prosperity and well-being" (p. 43).

In contrast, many governmental documents related to the SAPAI call for an active role for citizens. For instance, the parliamentary letter 'AI, public values and human rights' calls for 'strengthening the understanding and awareness of citizens by means of dialogue' (Ollongren, 2019, p. 5). The Dutch response to the EU's Coordinated Action Plan for Artificial Intelligence states that 'the EU emphasises a discussion on AI and the societal impact, but [the EU] should go one step further and aim for a way in which the society at large can be involved' (Blok, 2019a, p. 6). Also, the parliamentary letter on trust in human-centric AI mentions that 'the proposal to stimulate (civic) participation in the development of AI […] received a positive response by the cabinet' (Blok, 2019b, p. 5). Nevertheless, a similar call for public engagement is not found in the SAPAI.

Role of research and development

The strategy calls for both "top-quality scientific research as well as applied research that businesses and professionals can use" (MEACP, 2019a, p. 7). The latter seems to be most important as most of the examples, proposed actions and financial means are directed towards turning AI into something usable and/or profitable (see e.g. p. 15-16, 24 and 54-61). This preference is also expressed in a parliamentary letter on the Dutch innovation policy:

> "In the end we want to gain the maximum societal and economic effect from every euro, idea and solution. That these solutions are so interesting and lucrative that big companies, small and medium-sized companies, start-ups and scale-ups can also make money from it beyond the borders of the Netherlands" (Keijzer, 2019, p. 4).

Consequently, nearly all publicly funded AI research and development (R&D) activities are either undertaken in collaboration with companies or in another way aimed at stimulating the application of AI (MEACP, 2019a, p. 61). More specifically, these research initiatives aim to identify the chances, risks and bottlenecks relating to AI development and application. For instance, research is conducted to anticipate "opportunities for the application of AI in […] cybersecurity, policy tasks and defence"

(p. 15) or "the major potential impact of AI on cybercrime, system hacking and cyberwarfare" (p. 50).

Even the fundamental R&D activities seem to be directed towards usability and profitability. An important part of the (proposed) fundamental research aims at developing trustworthy and human-centric AI (MEACP, 2019a, p. 27 and 44). The SAPAI states that "the Netherlands is following the European approach to responsible people-oriented AI, which can be a unique proposition for Europe to profile itself internationally" (p. 43). A parliamentary letter on human-centric AI also notes that the 'ethical approach to AI can strengthen the trust of the citizen in the digital development and give European AI-companies a competitive edge' (Blok, 2019b, p. 2). Similarly, an expert called trustworthy and human-centric AI 'a unique selling point' during a roundtable discussion (PCEACP, 2020a).

Cooperation

Lastly, cooperation is key to the Dutch approach to AI. Besides the distinct roles that are outlined above, the SAPAI often stresses the importance of cooperation. Cooperation with international and European partners is sought for, among other things, sharing data (MEACP, 2019a, p. 15), pooling forces (p. 27), setting up ethical and legal frameworks (p. 43) and addressing security risks (p. 50). Looking at the national level, the SAPAI states that the "strong foundation for public-private partnerships" (p. 7) is one of the country's strengths and "organising good cooperation between government agencies, companies and knowledge institutions, with shared responsibilities" is deemed "the Dutch approach" (p. 15). Central to this cooperation is the newly established public-private AI Coalition in which "companies, government agencies, knowledge institutions and educational institutions work together on generic issues in order to help specific application areas and sectors move forward" (p. 10). The Dutch government also "[calls] on companies and organisations to join in these efforts" (p. 7).

The notable absentees in the partnerships discussed and proposed in the SAPAI are the societal partners as multiple parliamentary documents related to the SAPAI call for their involvement. These documents mention, for example, that 'the cabinet is an advocate of partnerships between business and education and an active involvement of societal partners' (Blok, 2018, p. 5). Also, on two separate occasions prior to the publication of the SAPAI, the State Secretary of the Ministry of Economic Affairs and Climate Policy received parliamentary questions about the stakeholders that would be involved, and the role of societal partners in particular, in drafting the SAPAI (Kamerstukken II, 21501-30, nr. 451, 2019; Kamerstukken II, 21501-33, nr. 746, 2019). The State Secretary replied that 'the cabinet involves a broad spectrum of stakeholders in the development of the strategic action plan AI: from science, business, societal partners to local and regional authorities' (Kamerstukken II,

21501-33, nr. 746, 2019, p. 9). However, the SAPAI was eventually drafted in close collaboration with the AI Taskforce that does not include a societal partner.

Analysis

Imaginations of AI

By presenting AI as an instrument or tool, the SAPAI (MEACP, 2019a) hints towards the technology being apolitical. In the same way as thermometers or hammers appear value-free, so it would seem illogical to favour or oppose AI. During a roundtable discussion, the chair of the Dutch interest group for technology companies also claimed that AI is 'not a political subject', but that it is all about 'fitting [AI development and application] within the budget' (PCEACP, 2020a). This understanding of AI as being apolitical and value-free is further supported in the SAPAI by depicting AI as a simple technology rather than stressing its complexity and the features of AI that are difficult to grasp such as machine learning and neural networks. Simple technologies, such as hammers and thermometers, are highly predictable and uncontroversial and thus not something to fear or in need of much regulation or debate.

On the contrary, the strategy aims to 'sell' AI as a promising instrument as well as the acceleration of AI development and application. This is exemplified in the disbalance between the positive and negative references to AI. As mentioned previously, the disbalance becomes clear when the SAPAI is compared to the letter 'AI, public values and human rights' (Ollongren, 2019) that uses a much more critical tone. The letter states that both documents 'focus on different elements of the broader question of utilizing possibilities and addressing risks' (p. 1), which in effect means that the more in-depth discussion of the potential risks of AI is left out of the SAPAI. Nonetheless, the SAPAI – with a virtually absent critical tone – is presented as 'the overarching AI-approach of [the] cabinet' (p. 1).

In summary, AI is imagined as a transformative instrument that will inevitably be developed and applied. There is little reason for concern or debate because AI is a simple and apolitical technology, and the positives outweigh the negatives. On the contrary, the Netherlands should capitalise on the societal and economic opportunities that this promising instrument offers.

Imaginations of a desired future with AI

The strategy's vision on the future further emphasises the need to take swift action. The SAPAI positions the Netherlands in a globally competitive market with a 'winner-takes-all' dynamic. In doing so, the development and application of AI is depicted as a race for, among other things, knowledge, talent and risk capital (MEACP, 2019a, p. 22) in which the Netherlands competes with other countries to become either a winner or a loser. The strategy is clear on what it would entail to

'lose the race'. The Netherlands would become depended on other countries which threatens the nation's economic security, autonomy and well-being (p. 10). However, the SAPAI does not explicitly state what it would mean to 'win the race'. The absence of a clear vision of a desired future was picked up on by a member from the Dutch Scientific Council for Government Policy who criticised the SAPAI for having blind spots due to framing AI development and application as a race. It is worthwhile to cite his contribution below at some length.

> 'The race is a dominant frame and as such led dozens of countries to publish an AI strategy that exhibits a strong understanding of the competition among each other. So the frame in itself already has an effect. […] The frame of a race does lead to some blind spots. That is where I want to draw attention to. First of all, due to the frame of a race, we get the feeling that we must take part so we do not miss the boat. This will partly be so, but then we forget to ask the question: what do we actually want with AI? What I see in the strategy is a strong sense that we need [AI] to maintain our prosperity, while AI, as a fantastic transformative technology, can also be approached from the question: what do we want with it? How can it really improve society? Instead of only being afraid that we will lose things' (PCEACP, 2020a).

In other words, the race metaphor diverts attention away from the question of what we are racing *for*. Rather than outlining a path of change, the strategy merely stresses the importance of *maintaining* the nation's prosperity by 'not losing the race'. In doing so, the SAPAI implicitly seems to envision a future in which the societal and political status quo is retained, assuming continuity in the current forms of social life and social order. Tellingly, the third track only discusses ways to *maintain* open and competitive markets (MEACP, 2019a, p. 39) and *safeguard* security (p. 39), public values and human rights (p. 41). Even though, as noted by a member of the House of Representatives, the nation's efforts should always aim to *promote* human rights according to international conventions (PCEACP, 2020b).

The Dutch government might have deliberately steered clear of any notions of a desirable future – besides maintaining the nation's prosperity and solving societal problems – because such notions are often politically sensitive. As long as AI is only envisioned to contribute to the widely supported political objectives of maintaining prosperity and fixing problems, then AI can maintain its apolitical appearance and the acceleration of AI development and application – a central aim of the strategy – can be legitimised without a notable public or political debate. On the other hand, if the strategy would outline ways in which AI can *improve* society, then this would almost certainly politicise the technology itself and its embedding in society as ideas abound in politics and society at large about what an improvement would entail. In short, it is relatively easy to agree that the situation should not get worse, but the question of what could be done to make it *better* is inherently political.

To conclude, the SAPAI reflects a depoliticised imagination of a desired future that steers clear of presenting politically sensitive notions of societal improvements and thereby assumes continuity in the current forms of social life and social order.

Envisioned governance strategy

So far, I have argued that the SAPAI reflects depoliticised imaginations in which AI is depicted as an apolitical and promising instrument that should be further developed and applied in order to maintain the competitive edge that prevents the country from 'losing the race' and allows the country to capitalise on the economic and societal opportunities of AI.

The depoliticised assessment of and approach to AI explains the negligible involvement of citizens and societal partners in both the drafting of the strategy and its implementation. Both the assessment and approach are depicted in a way that seems largely uncontroversial and thus does not necessitate civic participation or a public debate. Rather than calling for deliberation, the strategy stresses the importance of taking immediate action as "there is no time to waste" (MEACP, 2019a, p. 7). The role that citizens have to play in the envisioned acceleration of AI development and application is therefore limited to trusting AI applications – or rather, not resisting these applications. This trust can thus be understood as instrumental trust that is not an end in itself but a means to pave the way for accelerating the uptake of AI. Furthermore, in these imaginations of AI and the desired future with AI, there is no obvious role for societal partners which could explain their absence in the drafting of the SAPAI and the marginal role in the AI Coalition. An academic did critique the negligible involvement of societal partners during a roundtable discussion by stating:

> 'I think that AI should be approached more integral than it is now. […] On a societal level, it asks for more. [AI] is related to healthcare, education, law, peace, gender, inclusion et cetera. Therefore I believe that especially the societal impact must be approached on a more integral level than with a plan from within the Ministry of Economic Affairs and Climate Policy alone' (PCEACP, 2020a).

The strategy does touch upon many of these issues and, as noted by a member of the House of Representatives (PCEACP, 2020b), it is therefore all the more notable that the SAPAI does not outline a more integral approach.

When asked about the absence of societal partners in the AI Coalition, the senior official of the Ministry of Economic Affairs and Climate Policy in charge of the SAPAI replied: 'We are aware that this is strange. The Ministry of Economic Affairs and Climate Policy traditionally works from the 'triple helix' with knowledge institutes and companies' (PCEACP, 2020b). This 'triple helix' is at the core of the governance strategy outlined in the SAPAI. To stick with the metaphor of a race, companies are the ones put in the driver's seat as "they will determine whether the Netherlands leads the way in AI or ends up following other countries in this area, and whether AI applications will really benefit the Dutch economy and Dutch society" (MEACP, 2019a, p. 7). The government and knowledge institutes are envisioned to mainly perform supporting roles – both separately and in cooperation with companies and each other. For example, the government searches for ethical and

legal frameworks that do not impose unnecessary restrictions on innovation (Blok, 2019a, p. 8) and the three actors partner up to create a favourable business climate (MEACP, 2019a, p. 22) and develop human-centric AI as a unique selling point (p. 29).

In summary, the envisioned governance strategy is well attuned to the depoliticised imaginations of AI and the desired future with AI. Companies are envisioned to lead the way in the acceleration of AI development and application while the government and the (proposed) research and development activities are mainly concerned with supporting this endeavour. Citizens and societal partners, on the other hand, barely have a role to play as the depoliticised imaginations do not call for a public debate but rather urge the Netherlands to take swift action.

The Dutch technopolitical culture

We can better understand these imaginations surrounding AI by seeing how they connect to the Dutch technopolitical culture. The literature review revealed the two main characteristics of the Dutch technopolitical culture: pragmatism and a 'polder' culture. Both are discussed below as well as how these characteristics relate to each other. The section concludes by bringing together the insights into the Dutch technopolitical culture and the identified imaginations in the SAPAI in an attempt to answer SQ4.

First off, pragmatism – in the sense of favouring a practical approach to problems and affairs[2] – is an often recurring theme in the Dutch approach to technologies (see e.g. Bijker, 2002; Kouw, 2017; Segrave et al., 2014; Trauth et al., 1992; Van der Molen et al., 2019). As was the case in the study of Felt and his colleagues (2010) who identified the national technopolitical cultures of the Netherlands, France and Austria by studying how citizens talk about organ transplantation and genetic testing. They found that "in the Netherlands, the way participants imagined the two technologies was strongly tied to a focus on concrete problems" (p. 544) and "resolving particular issues took precedence over establishing shared values" (p. 544). To the extent that the Dutch do take values into account, they adopt "a rather pragmatic "reading" of [these] values" (p. 539). For instance, organ scarcity was the central theme in discussions of Dutch participants on organ transplantation. Even though they did discuss the value of self-determination, their solution to organ scarcity was formulated in pragmatic terms. An objection model – in which the default option is being registered as donor – was deemed a fair solution as the "freedom of decision also exists in this model "the moment one sends back the objection form"" (p. 539).

Furthermore, the Dutch participants "pondered whether technological progress would bring a potential solution" to organ scarcity (Felt et al, 2010, p. 540). This expression of techno-optimism is

[2] https://www.merriam-webster.com/dictionary/pragmatism

another aspect of the Dutch pragmatic approach to technologies (see also Kouw, 2017; Van der Molen et al., 2019). Technologies are "often addressed as a means for solving particular societal problems" (Felt et al., 2010, p. 544). Bijker (2002) also notes that the Dutch technopolitical culture exhibits "a certain trust in technical solutions and in technocracy" (p. 574-575) as well as "a general belief in the malleability of society" (p. 575). The Dutch technopolitical culture is thus further characterised by an optimistic belief that technologies can be used to create a desirable future.

The dominance of the pragmatic mindset in political debate and policymaking does not mean that the social, cultural and ethical concerns are left out of the debate or policies. For instance, societal and ethical concerns are a central part of the overarching Dutch Digitalisation Strategy (MEACP, 2018). However, the Dutch government "[tends] to treat economic concerns and societal concerns as a harmonious whole in which the pursuit of Dutch economic interests and the creation of socially desirable futures are largely treated as interchangeable" (Van der Molen et al., 2019, p. 343-344). Or, as stated in the annex of the Dutch innovation policy: 'Economic opportunities and societal challenges are two sides of the same coin in [this innovation policy]' (MEACP, 2019b, p. 1). The Dutch pragmatism is not threatened by societal and ethical concerns, because the government does not see a conflict or trade-off between these concerns and economic concerns. So, a strong economy is often synonymous with a socially desirable future in the Dutch approach to emerging technologies.

Secondly, the Dutch (techno)political culture is known for its 'polder approach' that is oriented towards collaboration, constant negotiation, compromise and consensus (see e.g. Bijker, 2007; Felt et al., 2010; Kirejczyk, 1999; Lamprinopoulou et al., 2014; Van der Molen et al., 2019; Van Dijck & Van Saarloos, 2017). Collaboration is often sought between a broad range of actors, including policymakers, experts, private parties, representatives from societal organisations and citizens (Hagendijk & Irwin, 2006; Lamprinopoulou et al., 2014; Van der Molen et al., 2019). As Bijker (2002) puts it: "Success has many fathers and Dutch success even more so" (p. 548). The discussions between the involved actors are characterised by constant negotiation and compromise. The Dutch deem this approach necessary as "they [see] themselves operating in a pluralist society that strongly depends on the negotiation of heterogeneous standpoints" (Felt et al., 2010, p. 548). Through negotiation and compromise the Dutch avoid deadlocks and open conflicts on issues involving values that could complicate (future) negotiations and agreements (Kirejczyk, 1999). The Netherlands also has a "history of public engagement in decisions affecting science and technology" (Hagendijk & Irwin, 2006, p. 342). A case in point is the way in which the Dutch handled the controversies surrounding nuclear energy in the 1980s (Geels & Verhees, 2011). Mass protests from antinuclear and environmental movements incited the Dutch government to initiate a nationwide 'Broad Societal Discussion' that consisted of about 2,000 public gatherings spread out over three years. Also, two decades later, when debates arose on genetically modified foods, the Dutch government organised

six focus groups, two public opinion surveys, programmes for schools, an interactive website and open meetings to engage with citizens (Hagendijk & Irwin 2006).

Analysis

One might wonder whether a pragmatic mindset and polder approach go together. Broadly speaking, the former favours *doing* while the latter is all about *talking*. I argue that the Dutch government works its way around this problem in the SAPAI in the same way as it did in the approach to biomedical technologies: by putting pragmatism first. More specifically, the relation between the two core characteristics can be described as: pragmatic where possible, 'poldering' where necessary. Central to this approach is the strategy of depoliticisation.

Depoliticisation did not emerge as a core characteristic in the literature review of the Dutch technopolitical culture as a whole, but it is a recurring theme in the articles discussing the Dutch approach to biomedical technologies (Felt et al., 2010; Kirejczyk, 1999; Timmermans & Scholten, 2006; Valkenburg & Aarden, 2011). For example, in vitro fertilization was initially deemed an 'instrument' and a 'medical technology' which, consequently, prescribed how IVF could and should be discussed, developed and applied (Timmermans & Scholten, 2006; Valkenburg & Aarden, 2011). For instance, IVF was considered a solution to the problem of infertility and arguments outside of the medical sphere (e.g. about the dignity of human life) were not considered valid in early Dutch debates on IVF. More generally, framing IVF as a medical technology placed it "outside the scope of politics" (Valkenburg & Aarden, 2011, p. 461). Rather than a broad public and political debate about this emerging technology, there was "a policy monopoly of self-regulation and a regime of procedures [serving] the interests of the closed community of medical professionals and departmental policymakers" (Timmermans & Scholten, 2006, p. 1114). Especially in the early stages of the debate surrounding IVF did the Dutch government employ this strategy of compartmentalisation in which the development and application of the technology were placed outside the scope of politics and in specific spheres of influence (Kirejczyk, 1999). Only those actors that could contribute to developing and applying IVF as an instrument were involved in the policy process.

It could be argued that we are currently in the early stages of the most recent AI debate (Roberge et al., 2020; Vicsek, 2020). Illustrative for this early phase is the SAPAI itself as it was only published two years ago as the first national AI strategy of the Dutch government. Just like in the initial approach of the Dutch government to IVF, we find a similar compartmentalisation in the approach to AI. The SAPAI was drafted under the influence of an economy-oriented technopolitical regime in which the Ministry of Economic Affairs and Climate Policy and the Dutch employers' organisation VNO-NCW are the main actors. Also, companies are said to be in the driver's seat and the AI Coalition that was set up to implement the strategy is overrepresented by private parties. It seems to be the case that, to

a certain extent, there is a 'policy monopoly' that most notably voices and serves the interests of the private sector. Consequently, AI is largely placed outside the scope of politics. This is further exemplified in the way the SAPAI presents AI as an apolitical instrument. Following the example of labelling IVF as a 'medical technology', the national AI strategy seems to label AI as an 'economic technology' – an instrument that, if correctly used, holds the great promise of increasing efficiency and effectiveness in all sectors and domains.

The depoliticisation of AI paves the way for a pragmatic approach. Just like other apolitical instruments such as hammers, the SAPAI reflects a vision on AI in which it does not demand much *talking* but invites *doing*. Indeed, the strategy does not outline any initiatives for civic engagement but is mainly concerned with 'selling' the pragmatic aim of accelerating AI development and, most importantly, application. It remains to be seen how long this pragmatic approach prevails. In the case of IVF, the polder approach took precedence after breakthroughs in cloning techniques stirred a public and political debate (Timmermans & Scholten, 2006). IVF was no longer merely a topic within the medical community but had now entered the public and political arena. The same was observed by Hagendijk and Terpstra (2004) in their analysis of the Dutch debate on nuclear energy. They note that "public turmoil about new technologies is often preceded by a phase of paradisiacal tranquillity" (p. 5). Furthermore, the narratives surrounding nuclear energy in early debates shows striking similarities with the ones found in the SAPAI:

> "[The] policy makers boasted general optimism about nuclear energy with a stern warning to the government: keep up with the US, or lose your industrial and economic position to those who will. The first post-war Dutch government wasn't deaf to this, and stimulated research into nuclear issues" (p. 5-6).

In a similar manner, the SAPAI stresses that the Netherlands must take swift action and accelerate AI development and application to maintain its competitive edge. However, the optimism surrounding nuclear energy did not last (Hagendijk & Terpstra, 2004). The public opposition gradually grew as environmental and health concerns became more prominently debated topics. Nuclear energy eventually became a highly politicised issue that incited mass protests and led the government to initiate the Broad Societal Discussion (Geels & Verhees, 2011).

This is not to say that the development of AI will certainly lead to mass protests and a broad societal debate, but the examples of IVF and nuclear energy do show one way in which the Dutch government combines a pragmatic mindset with a polder approach – a way that is also reflected in the SAPAI. Namely, an approach that can be described as 'pragmatic where possible, poldering where necessary'. Pragmatism characterises the assessment of and approach to AI with a focus on using the technology to solve problems rather than seeking a public and political debate. The negotiation, collaboration and consensus-seeking among a broad range of actors that characterise the polder

approach will most likely only enter the scene if AI becomes controversial and the depoliticised vision on the technology and its embedding in society can no longer be upheld. For now, pragmatism prevails in the Dutch assessment of and approach to AI.

Conclusion

The artificially intelligent genie is out of the bottle and there is no reason to assume that it will be put back in anytime soon. On the contrary, many countries across the world have published national strategies in recent years outlining their vision on AI, a desired future with AI and the governance strategy for attaining this future (OECD.AI, 2020; Van Roy, 2020). In this study, I have investigated the imaginations surrounding AI in the Dutch strategy and addressed the following research question: What imaginations of AI and its embedding in society are reflected in the national AI strategy of the Netherlands – and why these particular imaginations?

I used the concept of sociotechnical imaginaries as a theoretical and investigative lens to uncover the imaginations that are reflected in the SAPAI (Jasanoff & Kim, 2015). I found an imaginary that is characterised by depoliticisation. AI is depicted as an apolitical instrument and, as such, is placed largely outside the scope of politics. Rather than a political subject, the strategy presents AI as a promising 'economic technology' that can, and should, be applied in almost all sectors and domains. This depoliticised approach to AI is also exemplified in the strategy's imagined desired future that mainly focusses on the widely supported objectives of maintaining prosperity and solving societal problems. Politically sensitive notions of societal improvements are not outlined in the strategy that thereby assumes continuity in the current forms of social life and social order. The envisioned governance strategy is depoliticised through compartmentalisation. AI is placed largely outside the scope of politics and under the influence of the 'policy monopoly' voicing and serving the interests of the private sector. Citizens and societal partners are hardly involved as they have little to contribute to the pragmatic aim of accelerating AI development and application. On the contrary, their involvement could bring other visions on AI and a desired future with AI to the table which would undermine the depoliticised imaginary reflected in the SAPAI.

Besides offering a lens to identify imaginaries, the concept of sociotechnical imaginaries also draws attention to the country-specific cultural embedding of imaginaries – both in shared understandings of how technologies ought to be assessed and approached and in the performance of (the interplay of) institutions (Jasanoff, 2015). I drew on the concept of technopolitical cultures to investigate this cultural dimension (Felt et al., 2010; Felt & Müller, 2011). I found that the Dutch technopolitical culture is characterised by pragmatism and a deliberative and consensus-oriented

'polder approach'. Similar to the Dutch approach to biomedical technologies (Kirejczyk, 1999; Timmermans & Scholten, 2006; Valkenburg & Aarden, 2011), the SAPAI puts pragmatism first by drawing upon a strategy of depoliticisation. The strategy depicts AI as an apolitical 'economic technology' that should be used rather than discussed. A polder approach is therefore considered an unnecessary impediment to the acceleration of AI development and application. Pragmatism, on the other hand, is the strategy's 'knowledge-way' that makes the outlined assessment and approach appear rational and legitimate. The technopolitical regime consisting of mainly economy-oriented institutions similarly influenced the SAPAI on a systemic level. The culture of this regime – in terms of its goals, interests, practices and ideologies – is expressed in, for example, the pragmatic reading of AI as an instrument and in the vision on the future as being determined by one's own performance in a globally competitive race.

To sum up, I conclude that the SAPAI reflects a depoliticised imaginary of AI and its embedding in society that serves the purpose of paving the way for the acceleration of AI development and application. This assessment of and approach to AI can be understood as resulting from a particular expression of the Dutch technopolitical culture in which pragmatism is favoured over a polder approach based on deliberation and consensus.

For some, one question may have remained unanswered: so what? How do these findings translate to actual practice? I have argued that studies like these can open up, stimulate and enrich the public and political debate on technological development. Uncovering imaginations of desired futures conjures up vivid images of how technologies and their embedding in society are envisioned. These images offer an accessible insight into national technology policies that, in turn, subject these policies to reflection and critique. To further clarify the practical relevance of this study and simultaneously make a small contribution to the (still marginal) public debate, I will briefly share one of my reflections on the findings.

I will reflect on the SAPAI's deliberate choice to depict AI as an instrument rather than a humanlike technology. First, there is reason to do so because the latter could lead to misconceptions such as the idea that AI systems *think* like humans – which is a misleading way of understanding how AI systems operate (Bunz, 2019). Or, as Van Belkom (2019) aptly puts it: submarines do not swim. However, AI-driven systems can significantly influence *what* we think as well as our broader perception of reality. For example, the Netflix documentary *The Social Dilemma* shows how the AI-driven recommendation systems of social media platforms create bubbles of personalised news that, if used as the main source of information, create "a unique universe of information for each of us" (Pariser, 2011, p. 9; Zuiderveen Borgesius et al., 2016). This in turn leads to less mutual understanding and an increasingly hardened and polarised public and political debate. The way in which we relate to AI in our daily lives is therefore perhaps better understood as an influential

significant other (i.e. humanlike) rather than a simple instrument. This is not to say that AI *is* a significant other, but this image alone broadens our perception of really how transformative AI could be.

Finally, I hope that this thesis will convince any reader of both the significance of imaginations in general and their own imaginative power in particular. I believe that AI currently calls for a more vivid public debate to find a shared vision on what a *better* society entails and how AI fits in this society. A debate that does not revolve around the question of how the future with AI *will* be, but how we *want* it to be. You may not understand the technical aspects of AI or consider yourself incapable of reflecting on something as elusive as AI or its place in society. However, the ability to imagine a better society than the one we live in today is within everyone's reach. Developing these imaginations and bringing those to the table will enrich the debate and provide guidance in the way we assess and approach AI. I do not share the belief that 'if you can dream it, you can achieve it', but I am convinced it is difficult to achieve a desirable future if we cannot first dream it.

Discussion

The idea that imaginations can make futures conceivable and therefore attainable is fascinating to me. Understandably, I was thrilled when I found out that an increasing number of studies provide theoretical and empirical support to the notion that, indeed, imaginations have real-world policy implications and shape the course of technological development. This thesis offered me the change to emerge myself in and make a small contribution to this area of research.

However, I have not received specific training in this field of research and therefore struggled to acquire the analytic capabilities that I saw demonstrated in the articles and books on sociotechnical imaginaries and technopolitical cultures. I ascertain that, unfortunately, this study does not match the richness and depth of similar studies. Besides that, this study would have benefited from choosing another country's strategy to contrast with the SAPAI. Contrary to expectations, the United States turned out to be a contrasting case of little value as the Dutch assessment of and approach to AI were found to be in many ways similar to those of the US. This could indicate that the Dutch imaginations surrounding AI are more dissimilar to those of other European countries rather than the US as previous studies found significant differences between the latter two (Burri, 2015; Gaskell et al., 2005; Hurlbut, et al., 2020; Jasanoff, 2005b). Thus, future studies might benefit from contrasting the Dutch technology policies with those from other European countries instead of the US.

What this study lacks in richness and depth, it perhaps makes up for in novelty. Both AI as a technology and the Netherlands as a country have, to the best of my knowledge, not been subjected

to investigations into the sociotechnical imaginaries reflected in policy documents. Regarding the former, this study contributed by showing a distinct way in which AI and its embedding in society can be envisioned. Future studies can draw on these insights to contrast and identify the imaginations surrounding AI reflected in the policy documents from other countries. Regarding the latter, I have identified the main characteristics of the Dutch technopolitical culture and discussed how these characteristics are reflected in the Dutch sociotechnical imaginary of AI. These insights can be used in future studies to investigate how the Dutch technopolitical culture is reflected in the broader Dutch innovation policy or policies on other technologies in particular.

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Appendix A

Table 1: Overview of the additional material.

Date	Type	Name
4-6-2020	Plenary debate	Kunstmatige intelligentie en sleuteltechnologieën
12-3-2020	Parliamentary committee meeting	Kunstmatige intelligentie en sleuteltechnologieën
20-2-2020	Parliamentary committee meeting	Strategisch Actieplan voor Artificiële Intelligentie (Rondetafelgesprek)
20-2-2020	Parliamentary committee meeting	Strategisch Actieplan voor Artificiële intelligentie (Technische briefing)
8-10-2019	Parliamentary paper	Waarborgen tegen risico's van data-analyses door de overheid
8-10-2019	Parliamentary paper	AI, publieke waarden en mensenrechten
18-7-2019	Position paper	Algoritmen die werken voor iedereen
1-7-2019	Parliamentary paper	Informatie- en Communicatietechnologie (ICT) in de Zorg
17-5-2019	Parliamentary paper	Fiche: Mededeling Vertrouwen kweken in de mensgerichte kunstmatige intelligentie
26-4-2019	Parliamentary paper	Kamerbrief over missiegedreven Topsectoren- en Innovatiebeleid
26-4-2019	Parliamentary paper	Aanpak sleuteltechnologieën
26-4-2019	Policy document	Missiegedreven Topsectoren- en Innovatiebeleid
21-2-2019	Parliamentary paper	Verslag van een schriftelijk overleg over de geannoteerde agenda informele Telecomraad 1 maart 2019
14-2-2019	Parliamentary paper	Verslag van een schriftelijk overleg over de geannoteerde agenda Raad voor Concurrentievermogen op 18 en 19 februari 2019
31-1-2019	Parliamentary paper	Non paper NL on the draft EU ethics guidelines for trustworthy Artificial Intelligence
30-1-2019	Parliamentary paper	Fiche: Gecoördineerd actieplan Kunstmatige Intelligentie (AI) voor Europa
7-12-2018	Strategy	Coordinated Plan on Artificial Intelligence
6-11-2018	Report	AI voor Nederland: vergroten, versnellen en verbinden
1-6-2018	Strategy	Dutch Digitalisation Strategy
1-6-2018	Parliamentary paper	Fiche 7: Mededeling Kunstmatige intelligentie voor Europa
25-4-2018	Strategy	Communication Artificial Intelligence for Europe