AI Policy as a Response to AI Ethics? Addressing Ethical Issues in the Development of AI Policies in North Africa

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Introduction

The concept of artificial intelligence (AI), despite its 70-year history (McCarthy et al. 2006), has become highly prominent since the mid-2010s. It is commonly accepted that this is the result of the availability of large datasets and increasing computing power which allowed established and novel approaches to machine learning, such as deep learning and artificial neural networks to demonstrate their capabilities (Hall and Pesenti

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2017). There is broad recognition that the potential of this development is far from achieved and that AI applications are likely to radically change many processes in business and administration, but also in the personal lives of citizens and consumers.

These developments are welcomed by many, as they raise the vista of increased economic well-being but also the resolution of many challenges that can benefit from new computational approaches, for example, in diagnosis and delivery of health care, data analysis in big science or the reduction of climate-relevant emissions. At the same time, there are steadily increasing concerns about the potentially negative impacts on ethics and human rights that these technologies may have.

Policymakers and decision-makers in industry, civil society and elsewhere are thus faced with the challenge of harnessing the benefits of AI while managing the ethical and other risks these technologies may pose. This is exacerbated by the apparent perception of competition between countries, all of which want to be the first to benefit from AI and want to strengthen their AI industry which is seen as a source of economic but also political competitiveness.

This situation which is characterised by a strategic dominance of the big economic and technical blocs that hold much of the knowledge, technology and data to make AI succeed (USA, China, EU) raises the question of how countries outside of these power blocs can approach AI. One crucial question that forms part of this broader issue is whether and how current AI policies can address the ethical and human rights issues linked to AI.

This chapter contributes to knowledge by offering an analysis of AI policies in North Africa and offers the first analysis of the way in which ethical issues have been considered in these policies. This analysis highlights strengths and limitations in existing policies. These insights are relevant to policymakers who aim to develop AI strategies, in Africa and elsewhere.

The chapter starts with a brief overview of the AI ethics discourse, suggesting that it would benefit from a systems perspective. It then provides an overview of current AI policies. This is followed by a discussion of AI strategies in North Africa. The discussion section explores how ethical concerns are covered in the North African AI strategies and which gaps and opportunities in terms of coverage of ethical issues arise from the current state of these policies.

Ethics of AI

The chapter rests on the assumption that policy can be used to address ethical concerns. This implies a broad understanding of ethics as anything having to do with the distinctions between right and wrong, good and bad, appropriate and inappropriate. Using such a broad starting point, it is probably uncontentious to say that at least some policy initiatives are driven by ethical concerns. The question of this chapter is whether in the field of AI such concerns can and should motivate or drive policy agendas.

An Overview of AI Ethics Issues

Ethics as a discipline of philosophy has produced numerous theoretical positions using different aspects to distinguish right from wrong. These include duty-based (deontological) positions which use the intention of an agent to provide an ethical evaluation of actions (Kant 1797, 1788). Further well-established ones look at the consequences of actions for this evaluation (Bentham 1789; Mill 1861) or the character of the agent (Aristotle 2007). There are furthermore numerous more recent theoretical positions specifically aimed at computing and information technologies (Bynum 2001; Floridi 1999; Introna 2005), including recent attempts to formulate ethical positions specifically for AI (AI HLEG 2019; Borenstein et al. 2021; Dignum 2019). The dominant conceptual approach to the ethics of AI, however, is not to use philosophical theories but to refer to mid-level principles and guidelines (Jobin et al. 2019).

The aspect of AI ethics that may motivate policy developments, however, is usually not the theoretical reflection and evaluation of ethical concerns, but the concerns themselves. We use the term 'ethical issue' to denote phenomena that are perceived as ethically problematic. These ethical issues are subject to empirical investigation and often to intervention. There are numerous ethical issues of AI that are prominently discussed, and we now highlight some of the most significant ones.

A discussion of the ethics of AI needs to be informed by the capabilities of AI which are the reason for the rapidly increasing use of AI technologies. This, in turn, requires a definition of the term AI. While AI has been a part of computer science since the 1950s (McCarthy et al. 2006), It has only been during the last 10 years that some of the approaches that constitute AI have made significant progress in solving relevant problems (Boden 2018; Stone et al. 2016). This refers in particular to machine learning that has benefited from the availability of computing power, large data sets and improved algorithms (Hall and Pesenti 2017; UKRI 2021).

While the field of AI is broader than machine learning (Elsevier 2018), it has been the success of machine learning that has led to high expectations for AI.

The benefits of machine learning arise from its ability to analyse large datasets and identify patterns in data. The consequences and benefits of the capability depend on the specific application. Very generally, one can say that AI can improve the use of large data sets and thereby help address a broad range of questions. This can translate into increased economic efficiency, but also better understanding of environmental challenges (AI Council 2021) or ways of promoting the UN's Sustainable Development Goals (AI HLEG 2019) and be used for 'good' (Berendt 2019), i.e. for morally desirable purposes.

The flip side of these benefits of AI, however, is similarly visible and important. Current machine learning techniques require access to large data sets in order to extract information and construct models. This raises concerns about privacy and data protection (Buttarelli 2018; EDPS 2020). Ongoing data use can constitute problematic surveillance, in particular where novel biometric data such as emotional data are used (Dignum 2019). AI systems that are used for decision support can perpetuate and even exacerbate existing biases (Access Now 2018) which can lead to unfair discrimination (Latonero 2018) on the basis of sensitive characteristics such as gender, age or race. With the growing importance of AI systems, their reliability and security (Brundage et al. 2018) become pressing questions, including on the national level (Babuta et al. 2020).

The growing use of AI across all areas of society, private organisations and public administration raises concerns about ethical consequences of their large-scale deployment. AI has already reshaped large parts of the economic system and contributed to new ways of wealth creation. While the potential of AI to create wealth is undisputed, the justice of the subsequent distribution of this wealth is a major cause for concern (Zuboff 2019). At present, the main beneficiaries are big organisations that hold data and computing resources, so that AI perpetuates and exacerbates inequality on a local and global scale (European Parliament 2020). Furthermore, AI is likely to have consequences for employment (Kaplan and Haenlein 2019; Rai et al. 2019), even though the full impacts of AI on employment remain contested (Willcocks 2020).

Economic consequences of AI spill over into the political field where there are worries that AI technologies can damage democratic processes, for example, by disrupting elections or contributing to political decisions in opaque ways (Yeung 2018). The concentration of wealth in the economic field can support a similar concentration in political power

which has led to calls for political and legal interventions (Coeckelbergh 2020; Nemitz 2018). In addition, AI can lead to changes in ethically relevant areas. It has the potential to change the nature of warfare by introducing autonomous weapons (Guterres 2020; Richards et al. 2020). The growing use of AI requires significant energy which is an important part of AI's environmental impact (Nishant et al. 2020; UNESCO 2020).

A further set of ethical concerns about AI is how it affects human freedom and possible actions. Autonomous decision-making is one of the capabilities of AI, but it is highly contested whether and to what degree this should be encouraged or permitted. There are strong calls for ensuring human control of AI (Council of Europe 2019). Such calls do little to change the fact that technology, increasingly including AI, structures human spaces for action. What we perceive to be possible or not is affected by the technical capabilities that surround us.

A final set of ethical concerns that figure prominently in the AI ethics debate has to do with the potential of truly autonomous machines. This is sometimes referred to as Artificial General Intelligence (AGI) or general AI. These are machines that would have truly human (or super-human) reasoning abilities and emulate humans' cognitive processes (Shneiderman 2020). Such machines do not currently exist and it is unclear whether they will ever be possible using existing technological principles (Smith 2019). They nevertheless figure prominently in popular culture and inspire ethical questions such as whether machines could develop consciousness, deserve to be assigned rights, and have personhood.

An Ecosystems Perspective on AI Ethics

The above quick overview of some of the key discussion points of AI ethics has shown the breadth of the debate, based on different concepts of AI and the almost infinite set of possible applications. This calls into question what might be called the common-sense approach to the ethics of AI. By this we mean, the view that there is a clearly identifiable technology called AI which, when used has clearly identifiable consequences that translate into ethical concerns. Once recognised, these can then be addressed and rectified.

This common-sense view which is not usually spelt out in detail, arguably underlies much of the discussion of how to deal with ethics of

AI. When spelt out in the simple form just suggested it is clear, however, that this view is not tenable. AI is not a clearly identifiable technology but a set of families of technologies and techniques that have very little in common. The current focus on machine learning has the advantage of narrowing down the candidate technologies but it misses the fact that there are other fields of AI such as expert systems or fuzzy logic which justifiably use the same label but do not share the same technical characteristics. Furthermore, the ethical issues raised by AI are context-dependent. AI does not 'have' ethical issues, but these emerge in contexts of use depending on the stakeholders that are involved. Whether the ability of AI to detect patterns in the data and propose actions on this is ethically problematic has little to do with the technical implementation and more with the moral sensitivities of the people who are involved.

Elsewhere we have therefore proposed to look at AI through the lens of a system, more specifically to see AI as a (set of interlinking) innovation ecosystems (Stahl 2021; Stahl et al. 2021). AI as instantiations of computer systems can easily be described from a systems perspective. There is a long-standing tradition, in particular in the field of information systems to highlight the social side of systems by focusing on the concept of socio-technical systems (Avgerou and McGrath 2007; Leonardi 2012; Mumford 2006). We are suggesting that this socio-technical approach is important to be included in the ethics of AI debate, as it can explain the interdependence of actors and technologies, the difficulty of predicting outcomes and the challenge of delineating the system and drawing clear boundaries.

We are furthermore pointing to the literature on innovation ecosystems (Adner 2006; Carayannis et al. 2021; Moore 1993) as a further source of inspiration that would benefit the AI ethics debate. This literature has a focus on the process of innovation and the creation of new socio-technical systems, which is the stage where AI remains. It has developed a number of concepts and methods to understand the state of an innovation ecosystem as well as means of intervening and governing such systems (Lis and Otto 2021; Wareham et al. 2014). Combining systems theory and ethics is not trivial and it goes beyond this chapter to explore their relationship. For our purposes, it is sufficient to point to the socio-technical innovation ecosystems nature of AI to highlight that addressing their ethical consequences is not straightforward. This allows us to return to the main point of this chapter, namely to explore whether and how AI

policies and strategies take into account ethical concerns and may even offer avenues for addressing them.

AI Policies and Strategies

Since 2016 a broad range of soft-law (non-regulatory) approaches to AI have been released by governments, international organisations, multinational corporations, civil society organisations and non-governmental organisations. With the overarching purpose of promoting the benefits and addressing the risks of AI (Roberts et al. 2021), this body of documents includes policies, strategies, reports, white papers, guidelines and principles. While not legally binding, these documents can frame the thinking and can influence decision-making within stakeholder groups about AI (Jobin et al. 2019).

Concepts

Within the scholarly community, there is some debate around the relative merits of creating strategies versus policies in order to address the risks and promote the benefits of AI. Fatima et al. (2020) argue that strategies and policies can be distinguished in the following way; strategies set out the vision and ambitions along with key priority areas and rationale behind these choices, whereas policy involves the operationalisation of the strategy into tangible objectives and sets of actions. However, much of the research around AI, ethics and governance, uses the terms 'policy' and 'strategy' interchangeably (Roberts et al. 2021; Robinson 2020). As such, and in order to consider a suitably wide range of approaches to ethical issues in AI policy/strategy, for the purposes of this chapter, we will consider policies and strategies jointly, adopting Calo's (2017) broad definition of 'policy' as a concept used to describe "societal efforts to channel AI in the public interest", which clearly coincides with the intention to promote the benefits and address the risks of AI inherent to both policies and strategies that consider AI. In this chapter, we draw from a selection of AI policies described in more detail in Ulnicane et al. (2020).

The AI Policy Landscape

By their very nature national policies imply a fundamental level of competitiveness over collaboration, through the prioritisation of the impacts of

AI likely to be felt within that nation, and the promotion of the benefits and mitigation of the risks of AI for this prime stakeholder group—in fact, the very production of a national AI policy seems to itself have morphed into a statement on the seriousness with which the consequences of AI (to wit, the benefits of being first and a world-leader versus the detriment of being left behind) are being considered.

The consideration of AI policies and the extent to which they substantively address ethical issues requires an understanding of the vision for AI being promoted by policymakers. These visions vary greatly globally and can contribute to the prioritisation of certain ethical issues over others. China's AI policies (China State Council 2015, 2017) focus heavily on increasing economic and military competitiveness on a global scale and view AI as a strategic tool in promoting its global position (Allen 2019). The United States also derives its policy from the perspective of the protection of American interests globally through strategic military dominance ("DOD Adopts Ethical Principles for Artificial Intelligence" 2020; The Executive Office of the President of the United States 2020). Russia's AI policy follows clearly Vladimir Putin's assertion that "whoever becomes the leader in the field [of AI] would rule the world", espousing a vision of technological sovereignty and concomitant global competitiveness (Office of the President of the Russian Federation 2019). European national policies, however, have a much clearer focus on the societal impact of AI and seek to address the impact of AI on people's daily lives, ensuring that the benefits are shared and risk of harms mitigated for citizens (see, e.g. AI4Belgium 2019; Government Offices of Sweden 2018; House of Lords 2018). They broadly consider the need to promote and protect the fundamental rights of the individual, and that these rights should not be elided in the interest of promoting the economic benefits of AI (Cedric Villani 2018; European Union Agency for Fundamental Rights 2020). This is in no way to suggest that military applications of AI are not considered within the EU—simply that military applications are specifically eliminated from the scope of current policy and legislation (European Commission 2021). Furthermore, the very nature of the EU as a supranational organisation means that EU AI policy focuses strongly on value alignment across the member states and takes a highly collaborative approach to envisioning an AI future (The European Commission 2020).

There is a consensus amongst policymakers that AI, as a technology, creates ethical dilemmas (see, for example Campolo et al. 2017; Cedric

Villani 2018; European Commission 2018; World Economic Forum 2018). However, there is a breadth of consideration for what those ethical issues actually are: the primary issues identified by Ouchchy et al. (2020) differ from those identified by Stahl et al. (2016), which differ again from those enumerated by Stahl (2021). In order to maintain a focus on a clear vision for an AI future, many policies focus on a small number of specific areas of ethical concern. However, the consideration of these issues in policy, and substantively, the selection of issues for consideration, appears to vary greatly across policy. What follows is a brief overview of some of the more commonly addressed ethical concerns, and the approach taken to addressing these in policy.

One of the most robustly considered issues within AI policy is automation, and in particular the risk of jobs being displaced and replaced by AI. In general, policy focuses much more heavily on attempting to mitigate the risk of mass unemployment than trying to drive a benefit of AI—in the form of productivity gains—which is unsurprising given the strength of both feeling and rhetoric regarding unemployment, income preservation and state financial support for individuals (Thierer et al. 2017). While automation poses clear ethical questions about which jobs are likely to be automated (Big Innovation Centre 2017a), who is likely to be most affected (Big Innovation Centre 2017b), and where the responsibility for ensuring people's livelihoods lies (IPPR 2017), in practice policy takes a fiscal approach to mitigating the risks of job loss through automation; where job losses are expected to be manageable, policies tend to consider investment in retraining and upskilling programmes (House of Lords 2018). Where the expectation of job loss is much more severe, state financial support for the individual and universal basic income ideas tend to be promoted (Thierer et al. 2017).

Many AI systems are dependent on being trained on large volumes of data in order to perform effectively, raising concerns around the privacy of the individual and data protection (Campolo et al. 2017). Many of the concerns raised around privacy and data protection relate to the need to ensure that the use of data infringes on the rights of the individual to privacy as little as possible (House of Lords 2018), including considering issues of surveillance or monitoring which may become concomitant with the sharing of personal data (Campolo et al. 2017; The 2015 Study Panel 2016), while others focus on issues of re-identification of individuals through the process of data mining (World Economic Forum 2018). In

attempting to address some of these issues, some policies adopt the position of supporting a legal perspective (the human right to privacy [Ponce Del Castillo 2017]) or look to promote positive privacy steps through consideration of parties responsible for such breaches (UNI Global Union 2017).

In the light of a range of recent, high-profile scandals (see, e.g. Akter et al. 2021) many policies seek to robustly address the impact of biased and discriminatory AI. However, there are difficulties in trying to address these very different, yet interrelated issues through policy. Bias, the differentiation of outcome based on preference or likelihood, can occur when training an AI system on data which may reflect past decisions and therefore historic injustices and inequalities and unconscious discriminatory attitudes (Ferrer et al. 2021). A strong debate around whether bias should, or even can, be removed from datasets (House of Lords 2018) has created a lack of clarity about concrete steps that could be taken to address this issue (The 2015 Study Panel 2016), and in some cases has elicited allegations of the intention to render a social problem as a technical one (Jobin et al. 2019). Discrimination is considered an outcome that unfairly disadvantages or detriments one group of people in favour of another. Many national policies in Europe address issues of AI discrimination through the lens of the existing GDPR (European Parliament and European Council 2016) (under the extension of rights regarding automated decision-making (Centre for Data Ethics 2020; ICO 2017), and equality legislation (in relation to discrimination relating to protected characteristics) (European Union Agency for Fundamental Rights 2020).

Certain groups within society can be disadvantaged by AI across a number of vectors. Those in jobs likely to be displaced by AI is one group, and those in groups likely to be un- or underrepresented in data (resulting in bias and discriminatory outcomes) is another. However, the impact of AI may not simply amount to those that are negatively impacted by AI—consideration is also given for the fact that certain groups may not be in a position to benefit from AI (House of Lords 2018; IPPR 2017). The causes of this may be broad, and can include; a prohibitive cost of technology, lack of infrastructure and digital illiteracy, amongst other factors. Current policies identify this risk, but further exploration of a range of measures to mitigate this risk could prove fruitful.

Many policies address what is seen as a fundamental issue around the development, deployment and adoption of AI; namely, the concept of trust. This issue focuses around two key areas; trust in the AI systems

themselves (Campolo et al. 2017), and trust in the companies that develop and deploy AI systems (AI Now Institute 2018), and the argument is made that public trust in AI is vital in ensuring that it can be developed and deployed to the benefit of society (House of Lords 2018). There is a plurality of approaches to addressing this issue. Some policies advocate for regulation to boost public confidence in AI (European Commission 2018), others suggest that improving public understanding of AI (and its limitations) may help to address this issue (World Economic Forum 2018), some focus on the role of government in assuring the public of the safety of AI (IEEE-USA 2017), and yet more suggest co-creation strategies as a method of improving public confidence (The Federal Government 2018). Whilst there are such a wide range of strategies considered in these policies, few of them have been tested to determine their success in building public confidence—a determination made more difficult by the long-term nature of some of the impacts and effects of AI.

As well as addressing relevant and practical ethical issues, many policies also include some consideration for the future development of an AGI, for example, by asking how humanity can be protected from superintelligent machines and ensuring that such an AI would act safely (Big Innovation Centre 2017c; World Economic Forum 2018). While, as a point of philosophical discussion, these questions are clearly of interest to many scientists, policymakers and members of the public, it is worth raising the question as to the value added in the inclusion of this debate to policy, given the short- to mid-term nature of specific policy impacts and the likelihood that, if AGI were ever to be developed, it would be an emergence in the long term (Crawford and Whittaker 2016).

AI Strategies in Africa

Based on the understanding of AI ethics and AI policy developed in the preceding sections, we now evaluate how these topics are considered in Africa from the regional perspective by the African Union and as concentrated in each individual Northern African country. The North Africa region was selected as a case study for this purpose due to the relative proliferation of AI specific strategies in this area, as opposed to the more generalised strategies which include an AI element common in other regions of Africa (such as those relating to the 4th Industrial Revolution or the Digital Economy).

Processes for the Creation of AI Strategies in North Africa

Africa as a continent is not left out of the discussion regarding deployment of AI in different sectors of economic and social development. The diffusion of AI across different sectors of its application in Africa includes different stakeholders. The concerns highlighted in other parts of the world form the basis of a few national strategies such as Egypt as will be discussed below. Its deployment has seen active participation by the private and public sectors. AI Technology has been used in health, agriculture, fintech, public transportation as well as language translation. Academia has also developed different initiatives to ensure its development while the continent boasts of hundreds of AI hubs (Gwagwa et al. 2020). However, the absence of national policies regulating AI technologies has been of major concern (Candelon et al. 2021).

The negative impact of this challenge is not lost on the African Union which instituted a Task Force on the 26th October, 2019, mandating member states to "establish a working group on Artificial intelligence to study the creation of a common African stance on AI, the development of an Africa wide capacity to building framework and establishment of an AI think thank to assess and recommend projects to collaborate on in line with Agenda 2063 and the UNSDGs" (African Union 2020). African countries have established groups and initiatives to govern the technology. In 2019, the African Working Group on AI was established amongst other things, "to establish a common AI strategy for Africa" (OECD 2019).

In North Africa, comprising Morocco, Algeria, Libya, Egypt, Tunisia and Sudan, almost all the countries in the region have already instituted processes of framing policies to ensure safe deployment, harness economic potentials and ensure ethical use of AI. For example, Algeria presented its National Artificial Intelligence Strategy 2020–2030 on the 18th of January, 2021, to "improve Algerian skills in the field of AI through education, training and research, on the one hand, and strengthen these capacities as a development tool allowing socio-economic sectors to iron out the obstacles hindering the digital transition underway, on the other hand" ("Strategy for research in artificial intelligence launched" 2021).

Tunisia also joined the race by creating a Task Force to "devise a methodology and an action plan to produce the country's National AI Strategy (Ministère de l'Enseignement Supérieur et de la Recherche Scientfique 2018).

In crafting its national strategy, the Egyptian government formed the National Council for AI "as a partnership between the governmental institutions, prominent academics and practitioners from leading businesses in the field of AI" with a responsibility amongst others, to "identify AI applications that provide smart, safe and sustainable solutions and services". The country expects to "track and monitor the implementation of the strategy, laws and regulations, ethical principles and guidelines" (MCIT 2020).

These developments identify ongoing discourse on how national and regional policies on AI in Africa already anticipate ethical concerns in their quest to harness the full potentials which the technology is capable of on the continent. Government has been described as "both an enabler of innovation" and as "a driver of demand for AI". Thus, governments of African countries have the onerous responsibility of framing policies, establishing research centres while effective regulation must address issues relating to transparency, accountability, safety, etc. ("Developing an artificial intelligence strategy," n.d.; Kiemde and Kora 2021).

Future national policies, strategies and initiatives will further drive ethical considerations along with economic, social, impact on work, etc., as well as attainment of the United Nations Sustainable Development Goals (Vinuesa et al. 2020).

Specific Aspects of AI Strategies in North Africa

As already pointed out, only three of the 6 countries in North of Africa have made positive steps in the development of National AI Strategies. Of these countries, Egypt is the sole country that has completed the process of creating a policy document and has made this document publicly available online (MCIT 2020). It is interesting to see that Egypt's national AI strategy document titled "National AI Strategy" has in its mission the creation of governance mechanisms to ensure the sustainability and competitiveness of the AI industry in Egypt. This is important considering the dominance of the developed countries and their corporations in the AI industry and how adept they are at commercialising AI technologies. Although no justification has been provided, Egypt has identified 5 priority sectors for the development of AI namely Agriculture/environment and water management, Health care, National Language Processing, Economic planning and Manufacturing and infrastructure management. Also, the document says very little about ethical

governance of AI and related technologies except that there is an ambition to track and monitor implementation of strategy, laws and regulations, ethical principles and guidelines.

Although Algeria is said to have developed a national AI strategy, a policy document that fully spells out policy considerations of the strategy was not found during the development of this chapter, perhaps due to language barriers as it may be available in other languages other than English. What is publicly available, is a summary of an event to launch the Algerian AI strategy titled "the national strategy of research and innovation on Artificial Intelligence (2020–2030)" which can be found on the websites of the Algerian Embassy (2021). The strategy which appears to be directed at higher education aims to develop expertise in AI through teaching, training and research. According to the Algérie Press Service (APS 2021) while higher education is a priority sector for the strategy, the other priority sectors are health, energy and technologies. It appears there are little or no considerations for issues relating to ethics, regulation or governance of AI in the Algerian AI strategy as ethical considerations do not feature in the available documents.

While Tunisia has also taken important steps towards the development of a national AI strategy, very little information is publicly available about the ongoing development efforts. In 2018, the Tunisian Secretary of State for Research set up a Task Force and Steering Committee to develop the national AI strategy of Tunisia. The Tunisian National Agency for the Advancement of Scientific Research suggests that this strategy which aims at securing a respectable place and proactive role for Tunisia in the global AI sector also considers the ethical challenges of AI (ANPR 2018). A summary of the developments in the creation of AI strategies in North Africa can be seen in Table 1.

The above analysis gives some indication of how ethics have been addressed in the strategy documents of the North African countries. It has shown that very little has been said about AI ethics in the countries that have started developing AI strategies. While it would be interesting to understand why these policy documents barely mentioned AI ethics, there is very little information in the available documents to indicate why this is the case. Therefore, any explanation provided here would be mere speculation, rather than fact and that is not very helpful. What is clear from the document is that AI ethics is not a priority area in the countries that have begun devising AI strategies in North Africa.

Table 1 Overview of existing North-African AI strategies

Country	*Title of AI strategy document*	*Status*	*Policy areas/priority segments or sectors*	*Regulatory/ethical considerations*
Algeria	The national strategy of research and innovation on Artificial Intelligence (2020–2030)	Completed	– Higher education – Health – Energy – Technologies	
Egypt	National AI Strategy	Completed	– Agriculture/environment and water management – Healthcare – Natural Language Processing – Economic planning – Manufacturing and infrastructure management	Track and monitor implementation of strategy, laws and regulations, ethical principles and guidelines
Tunisia	National Artificial Intelligence Strategy	In progress		Sustainable, equitable development, and ethical challenges

Discussion

The above indicates that parallels can be drawn from the trajectories of national AI policies in North Africa with those on the global scene. For example, in recognition of the power of AI to transform lives and improve the economic landscape of nations, it can be seen that generally, AI strategies are geared towards national economic and technological advancement. Like other countries, the strategies of the North African countries have been designed to target specific sectors that can enable the achievement of such ambitions. By targeting sectors that have been historically neglected by the government such as health care and infrastructure development (e.g. energy), the AI strategies of North Africa are seeking to channel the productivity that AI enables for economic development. Also, in recognition of the fact that AI will play a major role in transformative technologies that will emerge in the next decade, North African

countries like Algeria have included education in the list of priority areas for AI.

Interestingly, unlike the United States and China, the North African countries appear uninterested in increasing their military competitiveness with the aid of AI as their national AI strategies have remained quiet on this subject. If it turns out that it is the case these countries are uninterested in the military uses of AI, then they cleverly avoid the ethical dilemmas associated with the use of AI for military purposes. As Pfaff (2020) points out, although the deployment and employment of AI in the military context might have its advantages, they could also be problematic, for example, by resulting in "atrocities for which no one is accountable". It is such concerns that have prompted the European Parliament (Legislative Observatory 2021) to stress that "autonomous weapons systems raise fundamental ethical and legal questions about the ability of humans to control these systems" and may therefore only be used as a last resort and must be subject to human control.

Unlike many of the big economic and technical blocks that dominate the AI landscape including the development of national AI strategies, the North African AI strategies contain little or nothing on ethical or human rights considerations for the deployment and employment of the technology nationally. For example, the Tunisian AI strategy only mentions a consideration of the ethical challenges of AI in its quest to attain a secure and respectable place in the global AI race. The strategy does not go into any detail about what type of ethical challenges it would focus on, or how this would be achieved. Similarly, Egypt, the only other country that has some sort of ethical consideration in its national AI strategy, appears to only be interested in the tracking and monitoring the implementation of ethical principles, guidelines, laws and regulations of AI. What it means by tracking and monitoring the implementation of ethical principles is ambiguous because there is no indication of the ethical principles that it considers important, nor is there a plan for achieving that in the strategy. There is, therefore, no substance to the statement on ethics and the interest in ethical AI can be said to be superficial.

As already pointed out in previous sections, the growing use of AI raises concerns about the ethical consequences of their deployment and employment across all areas of society. Considering the ethical concerns raised by the application and deployment of AI, the promotion of its benefits should never be undertaken without appropriate safeguards for the mitigation of its risks. In this respect, lessons can be learned from

other countries that have embedded clear mechanisms for the consideration of ethical governance of AI in their national AI strategies. For example, the UK which published its first dedicated national AI strategy on 22 September 2021 stresses that the UK must get the national and international governance of AI right to encourage innovation, investment and the protection of the public and fundamental values (UK Government 2021).

The UK AI strategy has, therefore, included themes on the ethical governance of AI throughout the document and indicates a clear mechanism for the attainment of this ambition giving an indication of the seriousness with which it considers this matter. Measures identified in its short, medium and long-term plan include governance and regulatory regimes that keep pace with the fast-changing demands of AI, a plan for horizon scanning to increase governments awareness of AI safety, publishing of a white paper on the national position on governing and regulation of AI, the development of cross-government standards, updating guidance on AI ethics and safety in the public sector, actions that can safely advance AI and the mitigation of risks, backing of diversity in AI, Measures identified in its short, medium and long-term plan include governance and regulatory regimes that keep pace with the fast-changing demands of AI, a plan for horizon scanning to increase governments awareness of AI safety, publishing of a white paper on the national position on governing and regulation of AI, the development of cross-government standards, updating guidance on AI ethics and safety in the public sector, actions that can safely advance AI and the mitigation of risks, and the backing of diversity in AI,

To avoid being forced to adopt or accept the standards set by other countries, the North African countries and by extension, countries in other parts of Africa would be well-advised to start now to seriously include ethical considerations with clear mechanisms for the attainment of ethical AI in their national AI strategies. As much as they are encouraged to learn from other countries in developing strategies for ethical AI, they must realise that the different cultures, values and norms in their home countries would likely require different ethical approaches. While they cannot get away with simply mentioning ethics in their strategies, they cannot simply copy the ethical standards set by others. Any ethical principles, standards, and governance mechanisms that are developed must also be done from the perspective of the protection of their people, their culture and their values.

Conclusion

We considered the different traditional definitions given to AI as a technology in writing this chapter. We then suggested a relatively novel perspective of defining AI as a family of technologies and techniques as a background for determining how ethics of the technology may be properly conceptualised. As a contribution to new knowledge, this chapter is framed to consider the subject of ethics as a proposed catalyst to activate, motivate and ensure that national policies on AI are prioritised on the continent, referencing developments in the northern region. We also introduced the socio-technical approach to be included in debates on ethics of AI to explain interdependence of actors and technologies. We suggest that this will help in properly shaping the question and resolution of what may be ethical about the deployment of technologies making up AI within different sectors. These are new perspectives which contribute to knowledge and suggest future discourse as may be directly related to the nuances of an heterogeneous continent, using the northern region for reference.

In this chapter, we have looked at key ethical concerns that AI raises and explored whether these are reflected in AI strategies and policies. While such strategies and policies have multiple goals, we found that addressing ethical concerns is often part of these. We then looked at the landscape of AI policies in Africa. We could only identify a limited number of these in North Africa but found limited engagement with ethical concerns in these North African documents.

The efforts at developing national strategies for deployment of AI are gaining momentum. We have been able to establish that regional bodies including the African Union recognise AI has a priority technology in the successful digitisation of processes for use in the private and public sectors. The reports of the United Nations (Hu et al. 2019) specifically tailored to examine AI readiness by African nations point to different challenges which militate against nations being able to develop AI strategies. Issues such as lack of technical knowledge, paucity of funds and critical infrastructure are just some of the pressing needs which the African States require to overcome. Thus, there is a pressing need to protect African citizens by ensuring deployed AI is safe for use, assurance that it will not lead to job losses or raise problems inclusion, recognition of diversities and gender equity are ethical concerns which should be incorporated into future national AI Policies.

In this instance, Africa will not need to play catch-up even though there are worries that it will be left behind in the adoption of technology. Proactive national policies which embody suitable ethical frameworks can be expected to emerge. Governments of African states could play more active roles with regards to the importance of safe and ethical AI to frame national policies which govern AI adoption by both the private and public sectors. While adoption of the technology has been accelerated and largely driven by the private sector, harnessing the full economic potentials requires a governance framework which is the responsibility of states. The establishment of such policy frameworks will assure investors and citizens alike and help countries benefit from AI while mitigating its undesirable side effects.

To effectively harness the benefits of AI while managing the ethical and other risks that AI technologies pose, we recommend that governments that are developing AI strategies or policies should not only set out their vision and ambitions along key economic segments or sectors but also seriously address the ethical issues of AI. This implies clearly spelling out mechanisms for the mitigation of such issues. Based on the insights developed in this chapter, we believe that it is possible to learn from the examples of other countries that have successfully developed an AI strategy that clearly balances their ambitions with ethical considerations and mechanisms. However, we suggest that in developing new strategies and policies governments should try to avoid copying strategies from other countries and instead base theirs on local considerations of values and cultures.

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