12 June 2020

EUROPEAN COMMISSION'S WHITE PAPER ON ARTIFICIAL INTELLIGENCE – ADOBE SUBMISSION

Adobe, Inc. ("Adobe") welcomes the opportunity to provide its feedback in response to the European Commission's "White Paper on Artificial Intelligence - A European approach to excellence and trust", published on 19 February 2020 (the "White Paper").

BACKGROUND

Adobe is the global leader in digital marketing and digital media solutions. Since the company's founding in December 1982, we have pushed the boundaries of creativity with products and services that allow our customers to create, deploy, and optimise digital content.

We have been operating in Europe for over 25 years and are a proud European employer, with a presence in 11 EU Member States and over 3,200 employees stretching from Ireland to Romania. Europe is our second largest market outside of the United States, where we are helping some of the largest European companies to deliver digital transformation strategies in fast-paced and highly complex economies. Our creative tools are used by millions of European creators to tell their digital story. We also have Research & Development bases in Germany, Romania, France, Spain and Switzerland. We place tremendous value in the European market and the potential to grow our business in the region.

Artificial intelligence ("AI") is a core element of Adobe's products. Our business is comprised of three cloud-based solutions – Adobe Creative Cloud, Adobe Document Cloud, and Adobe Experience Cloud – and all of them provide customers the use of AI for specific purposes[1]. Adobe's AI technologies, which we refer to as "Adobe Sensei," deliver intelligent features within each of our cloud offerings to dramatically improve the design and delivery of digital experiences, blending the art of content with the science of data.

AI now powers countless useful tools and innovations for the creative professionals, knowledge workers, and enterprise customers who use Adobe products every day. For instance, in the creative space, AI in Adobe's products and services helps creative professionals do their work in new ways: a graphic designer can now use AI-assisted search to find relevant stock images more easily[2]; a filmmaker can review footage more efficiently and get recommendations on possible edits; and creative professionals can save time by having the products they use most often, such as Adobe Photoshop, customised to their skill level and areas of focus.[3]

We see tremendous opportunities for AI to amplify human creativity and intelligence. At the same time, the continued advancement of AI puts a responsibility on us to address bias, test for potential misuse, and inform our community how AI is used. Our role is to ensure this new technology lives up to its potential and we take the ethical implications of it seriously.

At Adobe, we are guided by principles of responsibility, accountability, and transparency to enable the thoughtful deployment of AI in our products. Adobe's AI Ethics Council is led by our Executive Vice President, General Counsel and Corporate Secretary, Dana Rao, and is made up of a cross section of employees from our business who are focused on ensuring our AI is developed, implemented and maintained within an ethics framework that aspires to our guiding principles. Adobe's AI Ethics Council oversees how we create AI software, providing engineering and test development guidelines. We have taken part in the EU's AI ethics guidelines pilot phase and were encouraged to see that the guidelines were closely aligned with the ethical framework for our own AI product pipeline. We welcome the European Commission's efforts to outline a framework for the development of an ethical AI that allows companies to continue to innovate in this field.

We appreciate the opportunity to provide comments on the European Commission's White Paper and look forward to future opportunities to continue the discussion.

[1] https://theblog.adobe.com/amplifying-human-creativity-with-artificial-intelligence/
[2] https://theblog.adobe.com/adobe-sensei-ai-ml-image-search-discovery/
[3] https://theblog.adobe.com/demystifying-and-democratizing-artificial-intelligence/

COMMENTS ON THE EU'S WHITE PAPER ON AI

1. Adobe agrees with the need to clearly define AI for future policy-making initiatives

As outlined in the White Paper on AI, it will be crucial for the EU to determine the scope of the application for a future regulatory framework. To achieve this, we agree that in any new legal instrument, the definition of AI will need to be *"sufficiently flexible to accommodate technical progress while being precise enough to provide the necessary legal certainty"* (p. 17). We therefore welcome the Commission's efforts to develop a working definition of AI in its "Communication on AI for Europe" and further refining it via the work of the High-Level Expert Group on AI.

Definitions of AI can often describe specific use-cases of AI, rather than providing an overarching definition. In addition, the term "AI" is sometimes conflated with "Machine Learning" and "Deep Learning," both of which are subcategories within AI and describe a particular type of AI. For example, while all machine learning systems can be categorized as AI, not all AI utilise machine learning. It is also important as the field of AI expands that any definition of AI continues to be relevant.

Adobe worked with its engineers and researchers to develop its own definitions of AI, Machine Learning, and Deep Learning, which may be useful for the Commission to see how industry players define the terms when reviewing and adopting future iterations of AI definitions. Our definitions are as follows:

- The term "artificial intelligence" means a replication of human-like intelligence in a computer system made of computer software and/or physical hardware, where the system is capable of perceiving its environment, defining a course of action, and/or solving a task requiring knowledge, inference, reasoning, planning, learning, and language, through execution of a set of algorithms, including machine learning, to perform under varying and/or unpredictable circumstances.

- The term "machine learning" means an execution of one or more algorithms to perform a specific task, by ingesting data, learning from the data, and improving performance of the task based on the learning.

- The term "deep learning" means a particular type of machine learning the utilizes neural networks.

2. Adobe welcomes the EU's risk-based approach to develop a framework for AI

We support the Commission's view that **regulatory intervention on AI should be proportionate** and that a horizontal framework should aim to *"achieve its objectives while not being excessively prescriptive so that it could create a disproportionate burden"* (p. 18). It is crucial to avoid overregulation at these early stages, so that companies can invest and experiment in AI to deliver the best results both for the European economy and the wider society.

Adobe agrees that while AI has a wide range of benefits, the use of AI can also be associated to a set of risks, in particular concerning *"the application of rules designed to protect fundamental rights (including personal data and privacy protection and non-discrimination), as well as safety and liability-related issues"* (p. 11). Consequently, **we welcome the Commission's decision to follow a risk-based approach rooted in existing EU law**. As stated in the White Paper, this approach will necessitate "*clear criteria to differentiate between the different AI applications, in particular in relation to the question whether or not they are 'high-risk'*" (p.17).

Ensuring that the definitions and criteria used to determine that the concept of 'high risk' are precise will be critical. This applies not only to the cumulative criteria set out in the White Paper, but equally to the additional category of "*exceptional instances where, due to the risks at stake, the use of AI applications for certain purposes is to be considered as high-risk as such*" (p.18). If these 'exceptional circumstances' are left open-ended and are not precisely defined, it will negate the effectiveness of constructively defining the two cumulative criteria which will in turn lead to uncertainty in implementation. Therefore, this needs careful consideration and to be addressed before the implementation of a risk-based approach.

We are also encouraged to see that the EU's risk-based approach is reflected in other regions where Adobe operates (such as the US) enabling us to deliver products to our customers in a consistent manner that allows for the widest access to our latest innovations around the world. For example, in the U.S. Government's "Guidance Memorandum,"[4] it includes a risk-based approach that is rooted in existing law.[5]

We agree that when designing the future regulatory framework for AI, applications that do not fall under the 'high-risk' category should be exempt from additional mandatory legal requirements. Nevertheless, these applications must remain entirely subject to existing EU rules. It is important for fostering public trust in AI that existing laws should continue to protect consumers. The General Data Protection Regulation (GDPR) for example already establishes a certain level of trust with respect to the use of personal data and no additional requirements should be created if they already exist, though certain aspects of the current version of GDPR as written could pose issues for the natural state of AI development in Europe, as explored further in point 5 below.

3. **Adobe recommends further consideration and clarification of the voluntary labelling for AI applications proposals to determine its effectiveness.**

Adobe acknowledges the Commission's ambition to provide a level of consumer confidence when interacting with applications of AI in areas that do not qualify as 'high risk'. However, the proposal of voluntary labelling needs to be reassessed because the initiative set out in the White Paper would not meet the objectives it seeks to address.

We would urge the Commission not to pursue the creation of a blanket voluntary labelling system for AI systems that do not qualify as high risk. Given the diverse range of AI products and services that will fall into this category, a one-size-fits-all labelling scheme would, in our opinion, be unworkable, ineffective and open to manipulation.

Adobe agrees that fostering public trust is critical to promoting the growth of AI technology. In our opinion the proposed approach oversimplifies the concept of trustworthiness which will be more effectively built by brands and determined by the alignment of incentives and whether the performance of AI systems is meeting consumers' expectations. At Adobe, we strive to approach designing and maintaining our AI technology with thoughtful evaluation and careful consideration of the impact and consequences of its deployment. We believe this approach serves as a good foundation for building trust in our AI systems with our customers in a way that the proposed voluntary labelling system could not. Established players can and should demonstrate ways of ensuring consumer protection without the need for an imposed scheme.

4. **Adobe's Recommendations for high-risk AI applications – Types of Requirements (section 5D)**

While Adobe agrees with the European Commission that an AI application should be defined as being 'high risk' considering "*whether both the sector and the intended use involve significant risks, in particular from the viewpoint of protection of safety, consumer rights and fundamental rights*" (p. 18) and that that only 'high-risk' applications should be subject to mandatory legal requirements, we strongly disagree with the feasibility and effectiveness of the specific types of requirements detailed in section 5D as explained below.

Training data

We agree that the "*functioning of many AI systems, and the actions and decisions to which they may lead, very much depend on the data set on which the systems have been trained*" (p. 19). However, requirements that data sets be unbiased, "*sufficiently representative*" or "*sufficiently broad and cover all relevant scenarios needed to avoid dangerous situations*" (P.19) is a flawed approach in Adobe's opinion because we acknowledge that as a technical matter, it is

[4] U.S. Office of Management and Budget "Request for Comments on a Draft Memorandum to the Heads of Executive Departments and Agencies, 'Guidance for Regulation of Artificial Intelligence Applications,'" 85 Fed. Reg. 1825 (Jan. 13, 2020) ("Memorandum").

[5] Memorandum at 13 (noting that for AI applications that pose lower risk, agencies can rely on "less stringent and burdensome regulatory approaches – or non-regulatory approaches."); White Paper at 16-17 (noting "existing provisions of EU law will continue to apply in relation to AI," and that a "risk-based approach is important to help ensure that the regulatory intervention is proportionate."). See also, Comments of Adobe, Inc., U.S. Office of Management and Budget "Request for Comments on a Draft Memorandum to the Heads of Executive Departments and Agencies, 'Guidance for Regulation of Artificial Intelligence Applications,'" 85 Fed. Reg. 1825 (filed March 13, 2020).

not often possible to achieve unbiased datasets in reality and the EU would be better served to instead focus on ensuring the outcomes of the AI systems are not biased.

Efforts to 'debias' AI algorithms are frequently misguided, despite the best intentions, because the approach may wrongly suggest that bias-free data sets exist. Natural data sets will often be biased; they are a reflection of the real-world data contained therein. And in practice, the accuracy of AI predictions are dependent on the variety and naturalness of the data itself. Modifying the truth of data to adjust for bias will have an impact on the accuracy, and therefore the value of, the AI systems.

In addition, many AI systems rely on the constant flow of real-time and real-world data sets back into the system while they are providing services; data will keep streaming in, improving the performance of the AI system and this flow of real-time data sets should not be impeded or manipulated to attempt to debias them. Ensuring sufficient access to large amounts of high-quality data for training AI is important to combat algorithmic bias, rather than focusing on algorithms to "de-bias" the data. In the world of imaging applications, for example, not having clear guidance on the use of copyrighted materials for training AI models can exacerbate the bias, as companies, in an attempt to avoid risks of infringement, often feel compelled to limit their use of data to low quality, but readily available data.

Therefore, instead of focusing on data sets, it is more effective to focus on the outcomes of AI systems. For example, we agree that AI systems can present risks "*from flaws in the overall design of AI systems (including as regards human oversight) or from the use of data without correcting possible bias (e.g. the system is trained using only or mainly data from men leading to suboptimal results in relation to women)*" (p.11). While it is important to keep in mind the obligations of exiting data regulation like GDPR, rather than focusing on the data sets themselves, which often will reflect biases that exist in the real world, we suggest the focus should be on testing outcomes of the AI systems before deployment or applying safeguards against biased outcomes after deployment. To help support this approach, it requires testing and human involvement throughout the development of AI and with diverse teams involved that are continually evaluating the development and innovation of AI.

At Adobe, we start off with the following premises when developing our own AI:

<u>AI can be biased</u>

- Training datasets may have bias
- Stereotypes can get perpetuated either in recommendations, searches, or quality of tool so considered quality-control and review processes should be in place and outputs tested to protect against this.
- Humans applying algorithms can be biased.

<u>AI decision-making is often not explainable</u>

- The model structure used in the development process is a framework for the AI's decision making
- The numerical weights used in algorithms provide the "insight" and are optimised by training
- It may not be possible to say "why" AI made an individual decision
- Even looking at a training set is unhelpful, particularly when there are multiple training sets.
- We have some concerns and recommendations relating to the requirements for high-risk AI

Regarding possible requirements ensuring that the use of AI products or services complies with existing or complementary EU safety rules, as well as requirements ensuring that the use of AI systems does not lead to outcomes resulting in prohibited discrimination, Adobe recommends the following:

- The most efficient solution is to ensure that AI systems are trained on **data sets that are sufficiently broad.**

- It is not possible to completely avoid having biased datasets as all humans have innate biases and as a result those algorithms which are developed by humans can reflect those biases. Therefore, **ex-post requirements to test the outcomes of the applications are the most efficient solution to address the issues of bias and discrimination in AI.**
- The process to minimise bias in outcomes starts with the people involved. It is therefore the **responsibility of technology companies to ensure that software design incorporates diversity by ensuring their workforce is diverse** and is best positioned to identify and counter existing bias.
- This should not be translated into a requirement to demonstrate compliance to a regulator before launching; this would be impractical because it would require analysis and approval creating a potential administrative backlog and significantly delaying implementation.

At Adobe, we work hard to embody these goals and ethical values ensuring that we[6]:

- Work with datasets that represent society as a whole
- Create systems that don't amplify stereotypes
- Audit our findings to verify that we have captured the intended diversity
- Communicate our process
- Ensure that teams have varied backgrounds.

One practical way Adobe is exploring how inherent bias in AI can be identified and addressed is by using **standard test data sets**, which could be built and kept by industry consortium (per sector) and accessed by the relevant enforcement authorities.

Keeping of records and data

Whilst we acknowledge that record keeping obligations exist under GDPR and companies have a duty to comply with these, the Whitepaper's proposed requirements regarding the "*keeping of the data used to train high-risk AI systems, and, in certain cases, the keeping of the data themselves*" (p.19) would be unlikely to provide the insight desired to understand the AI better due to the numerous data sets used in training AI systems which could not be recreated, and AI systems may also be ingesting continuous flows of historic or real-time data over time, that is not necessarily stored after use long term. [The requirement also seems contrary to the idea of data minimization, where good practice is to only retain the data for as long as required for the initial purpose.]

Adobe has been developing world-leading software for over 37 years and with this heritage we recognise that many of the software-development tools and standards that have evolved over time and are used to help build trust in software do not exist for data; there are no common data naming conventions, no formatting standards or concurrent versioning systems used for data which make regulation in this area challenging due to the vast data sets used in AI development and no established standard to allow these data sets to be shared or reviewed in a way that would be meaningful for an assessment.

Robustness and accuracy

The proposal that "[*r]equirements ensuring that outcomes are reproducible*" (p. 20) is problematic because often it is not possible to achieve reproducibility. Many systems are setup to learn continuously from the new data, hence the outcomes are not reliably reproducible, therefore compliance with requirements of this nature would be impossible for many AI applications. Reproducibility of outcomes may require exactly reproducing the

entire dynamic environment and the entirety of the data flows used to train the model and this would simply not be possible in practice.

[6] https://theblog.adobe.com/adobes-general-counsel-makes-the-case-for-ai/

Interaction between the Whitepaper's goals, GDPR and proposed recommendations for 'high-risk' AI

Adobe welcomes both the EU's commitment to building an "*ecosystem of excellence*" and the Whitepaper's high-level goals of encouraging AI innovation and adoption in the EU; however, Adobe is mindful that there could be significant challenges for companies seeking to deploy AI models and applications at scale in the EU while conforming with the General Data Protection Regulation's ("GDPR") requirements and the Whitepaper's proposed requirements for 'high-risk' AI. Adobe would welcome guidance from the EU on how AI could be deployed at scale in the EU in a manner that would allow for companies to comply with both GDPR's requirements and the Whitepaper's proposed requirements.

5. **Adobe welcomes the EU's commitment to cooperate with international partners**

We welcome the EU's commitment to international cooperation on AI and its willingness to base it on an approach that "*promotes the respect of fundamental rights, including human dignity, pluralism, inclusion, non-discrimination and protection of privacy and personal data*" (p.9). Engagement with the Organisation for Economic Cooperation and Development (OECD), including the adoption of the OECD Principles that promote AI that is "innovative and trustworthy and that respects human rights and democratic values"[7] is an important aspect of leadership in AI. Adobe also stands ready to play a role in coordinating with international stakeholders through **developing industry standards** related to specific AI applications.

6. **Adobe welcomes the EU's commitment to securing access to data**

We agree with the Commission's stance that **improving access to and the management of data is fundamental for the development of AI applications**. AI opens creative possibilities, but truly realising these possibilities requires reasonably unrestrained access to data to train AI systems that enhance products across our business and enhance our users' ability to more efficiently innovate and unleash their creativity.

CONCLUSION

Adobe appreciates the opportunity to provide comments on the EU's risk-based approach to promoting AI uptake and innovation as outlined in the White Paper. We agree that a regulatory framework for AI must first and foremost be ethical, human-centric and aligned with our fundamental values.

In summary of Adobe's views on the White Paper:

- We acknowledge the clearly defining AI is critical at the outset.
- We welcome a risk-based approach that is rooted in existing EU law.
- Further consideration is needed to the voluntary labelling proposals to be effective and workable.
- We strongly disagree with the feasibility and effectiveness of the specific types of requirements detailed in section 5D, including proposals relating to 'Training Data', 'Keeping Records', Robustness and Accuracy', and 'Interaction with GDPR'.
- We welcome the commitment to co-operate with international partners.
- We welcome the commitment to securing access to data.

We look forward to continuing the discussion with the European institutions once the first legislative proposals on AI are put forward by the European Commission.

[7] http://www.oecd.org/going-digital/ai/principles/.