

WIPO CONVERSATION ON INTELLECTUAL PROPERTY (IP) AND ARTIFICIAL INTELLIGENCE (AI)

Second Session

REVISED ISSUES PAPER ON INTELLECTUAL PROPERTY POLICY AND ARTIFICIAL INTELLIGENCE

prepared by the WIPO Secretariat

INTRODUCTION

1. Artificial intelligence (AI) has emerged as a general-purpose technology with widespread applications throughout the economy and society. It is already having, and is likely to have increasingly in the future, a significant impact on the creation, production and distribution of economic and cultural goods and services. As such, AI intersects with intellectual property (IP) policy at a number of different points, since one of the main aims of IP policy is to stimulate innovation and creativity in the economic and cultural systems.
2. As policy makers start to decipher the wide-ranging impacts of AI, the World Intellectual Property Organization (WIPO) has started to engage on the aspects of AI that are specific to IP. There are several threads to this engagement, notably:
 - (a) AI in IP Administration. AI applications are being increasingly deployed in the administration of applications for IP protection. WIPO Translate and WIPO Brand Image Search, which use AI-based applications for automated translation and image recognition, are two examples of such AI applications. Several IP Offices around the world have developed and deployed other AI applications. In May 2018, WIPO convened a meeting to discuss these AI applications and to foster the exchange of information and the sharing of such applications.¹ The Organization will continue to use its convening power and position as the international organization responsible for IP policy to continue this dialogue and

¹ A summary of the meeting is available at https://www.wipo.int/meetings/en/doc_details.jsp?doc_id=407578. The Index of AI initiatives in IP offices is available at WIPO's dedicated website to AI and IP <https://www.wipo.int/ai>.

exchange. Questions related to IP policy aspects of AI in administration are set out in paragraph 46.

(b) IP and AI Strategy Clearing House. AI has become a strategic capability for many governments across the globe. Strategies for the development of AI capacity and AI regulatory measures have been adopted with increasing frequency. The Organization has been encouraged by its Member States to collate the main government instruments of relevance to AI and IP with the aid of the Member States. WIPO has issued a questionnaire and will publish a dedicated website shortly that seeks to link to these various resources received in a manner that facilitates information sharing.

(c) IP Policy. The third thread is an open and inclusive process aimed at developing a list of the main questions and issues that are arising for IP policy as a consequence of the advent of AI as an increasingly widely used general-purpose technology. For this purpose, a Conversation was organized at WIPO in September 2019 with the participation of Member States and representatives of the commercial, research and non-governmental sectors.² At the conclusion of the Conversation, a plan for the continuation of discussions by moving to a more structured dialogue was agreed in outline. The first step was for the WIPO Secretariat to develop a draft list of issues that might provide the basis for a shared understanding of the main questions that need to be discussed or addressed in relation to IP policy and AI. WIPO published a draft Issues Paper on December 13, 2019 and called for comments from all interested parties. WIPO requested submissions on the correct identification of issues and whether there were any missing issues. More than 250 submissions from the government and non-government sectors, including Member States and their agencies, commercial actors, research institutions, universities, professional and non-governmental organizations and individuals, were received and have been published on the WIPO website.³

3. The present paper constitutes the revised Issues Paper, which takes into account all comments received. In making the revisions the WIPO Secretariat was guided by a number of principles. New sections have been added where a clear gap in the draft Issues Paper was identified and a number of amendments were made to the wording of the Paper. Overall, the revised Issues Paper aims to retain its focus on the substantive legal questions raised by AI for IP Policy. As a result, while taking note of the many relevant follow-on questions raised in the submissions, a limited set was included in the revised document. Where opposing views were voiced in the submissions received, no changes were made to allow WIPO to maintain a neutral position.

4. Many respondents to the draft Issues Paper raised questions across a large range of policy fields including ethics, standards and privacy. As the WIPO mandate is limited to IP, questions outside that arena have not been included in the revised Issues Paper. The WIPO secretariat has taken note of these questions and is aware that the broad issues raised by AI will require a coordinated approach. WIPO is communicating closely with the agencies responsible for these related fields and the WIPO Conversation on IP and AI will feed into the different strands of the ongoing discussions. For example, WIPO is participating in the roundtables about AI and digital platforms set up in response to the recommendations made by the UN Secretary General's High-level Panel on Digital Cooperation in *The Age of Digital Interdependence* report. Also in response to this report, WIPO is taking part in the Road to Bern via Geneva dialogues on digital and data co-operation in the lead up to the 2020 UN World Data Forum.⁴ WIPO regularly collaborates with the International Telecommunications Union (ITU) in

² A summary of the Conversation is available at https://www.wipo.int/meetings/en/doc_details.jsp?doc_id=459091.

³ A database of submissions is available at https://www.wipo.int/about-ip/en/artificial_intelligence/policy.html#submissions.

⁴ Road to Bern <https://roadtobern.swiss/>. The road to Bern via Geneva <https://www.giplatform.org/rtb-geneva/>.

the *AI for Good* initiative.⁵ WIPO also supports the work that UNESCO has begun in the development of the first global normative instrument on the ethics of AI.⁶

5. Many respondents also noted the ongoing initiatives in other IP offices with respect to IP and AI. The WIPO Secretariat is aware of work in Member State IP offices and continues to cooperate with IP Offices in other AI policy initiatives and will collate information in the AI clearing house as noted in paragraph 2(b). As noted in paragraph 2(c), WIPO's plan for the continuation of discussions by moving to a more structured dialogue was agreed in principle by WIPO Member States at the first Conversation in September 2019. In addition, WIPO is an observer in IP5 NET/AI task force.⁷ WIPO also shares expertise with Member States and participates in information exchanges in both AI policy and AI tools.

6. This revised Issues Paper will form the basis of the Second Session of the WIPO Conversation on IP and AI, structured in accordance with the Issues Paper, which will be held in July 2020.

7. The issues identified for discussion are divided into the following areas:

- (a) Glossary
- (b) Patents
- (c) Copyright and Related Rights
- (d) Data
- (e) Designs
- (f) Trademarks
- (g) Trade secrets
- (h) Technology Gap and Capacity Building
- (i) Accountability for IP Administrative Decisions

8. No separate section concerning AI and unfair competition has been added. However, recognizing that IP law and competition law clearly relate, questions have been added in the various sections to highlight this relationship.

GLOSSARY

Issue 1: Definitions

9. This paper uses a number of terms such as "AI", "AI-generated", "autonomously generated by AI", "AI-assisted" etc. Many submissions commented that it would be helpful to have agreed definitions of these terms in order to facilitate the conversation on AI and IP.

10. The following definitions have been used for the purpose of discussion:

11. "Artificial intelligence (AI)" is a discipline of computer science that is aimed at developing machines and systems that can carry out tasks considered to require human intelligence, with limited or no human intervention. For the purposes of this paper, AI generally equates to

⁵ AI for Good Global Summit <https://aiforgood.itu.int/>

⁶ UNESCO Elaboration of an instrument on ethics of artificial intelligence <https://en.unesco.org/artificial-intelligence/ethics>

⁷ First IP5 NET/AI task force meeting takes place in Berlin, Germany <https://www.fiveipoffices.org/news/20200117>

“narrow AI” which is techniques and applications programmed to perform individual tasks. Machine learning and deep learning are two subsets of AI. While the AI field is rapidly evolving it is not clear when the science will advance to higher levels of general artificial intelligence which is no longer designed to solve specific problems but to operate across a wide field of contexts and tasks.

12. “AI-generated” and “generated autonomously by AI” are terms that are used interchangeably and refer to the generation of an output by AI without human intervention. In this scenario, AI can change its behavior during operation to respond to unanticipated information or events. This is to be distinguished from “AI-assisted” outputs that are generated with material human intervention and/or direction.

13. “Output” means inventions, works, designs and trademarks.

14. “Literary and artistic works” and “works” are used interchangeably and are defined as per Article 2 of the Berne Convention for the Protection of Literary and Artistic Works (as amended on September 28, 1979).

15. “Data subsisting in copyright works” is a term intended to distinguish between mere ideas which are not copyright protected and expressions of ideas which are protected. Data represent a mode of expression and data that represent original literary and artistic works are protected by copyright, also referred to “data subsisting in copyright works”. The term “data subsisting in protected designs” is intended to be understood analogously (see also paragraph 32).

- (i) Should the law define the line between AI-generated and AI-assisted outputs, and if so, how? How much human input should be considered material?
- (ii) Which further terms be included in an agreed Glossary, if any?
- (iii) Is it possible to define the terms in a technologically neutral way to take into account that the AI field and science is still evolving rapidly?

PATENTS

Issue 2: Inventorship and Ownership

16. In most cases, AI is a tool that assists inventors in the invention process or constitutes a feature of an invention. In these respects, AI-assisted inventions might not differ radically from other computer-implemented inventions. However, it would now seem clear that the role of AI in the invention process is increasing, and there are cases in which the applicant has named an AI application as the inventor in a patent application.⁸

17. In the case of AI-generated inventions:

- (i) Do AI-generated-inventions require patent protection or a similar incentive system at all? See also Issue 3(i).
- (ii) Should the law require that a human being be named as the inventor or should the law permit an AI application to be named as the inventor?

⁸ See EPO decision of 27 January 2020 on EP 18 275 163 and EP 18 275 174

<https://www.epo.org/news-issues/news/2020/20200128.html>,

UK IPO patent decision BL O/741/19 of 4 December 2019

https://www.ipo.gov.uk/p-challenge-decision-results/p-challenge-decision-results-bl?BL_Number=O/741/19 and

USPTO decision of 22 April 2020 on Application No. 16/524,350

https://www.uspto.gov/sites/default/files/documents/16524350_22apr2020.pdf

- (iii) If a human inventor is required to be named, should AI-generated inventions fall within the public domain or should the law give indications of the way in which the human inventor should be determined? Should the decision how to determine the human inventor be left to private arrangements, such as corporate policy, with the possibility of judicial review by appeal in accordance with existing laws concerning disputes over inventorship?
- (iv) If an AI application is permitted to be an inventor should the AI application be considered a sole inventor or should joint inventorship with a human be required?
- (v) The inventorship issue also raises the question of who should be recorded as the owner of a patent involving an AI application. Do specific legal provisions need to be introduced to govern the ownership of AI-generated inventions, or should ownership follow from inventorship and any relevant private arrangements, such as corporate policy, concerning attribution of inventorship and ownership?
- (vi) If AI-generated inventions are excluded from patent protection, what alternative protection mechanisms are available for such inventions? Would the lack of patent protection for AI inventions lead to the increase in the use of trade secrets and decrease of flow of information and technological advancement? If so, should policy address this and how?
- (vii) If AI-generated inventions do not benefit from patent protection, will this incentivize concealment of the involvement of AI? Should there be a system to prevent such behavior? How could such behavior be detected? Should each invention have a log of acts of the creation process leading to a protectable work and transparently identify the acts of each participant? In order to prevent circumvention of rules, should each invention involving an AI application have a declaration as to the involvement of the AI application?
- (viii) What ramifications would the question of inventorship and ownership have on related issues, such as, infringement, liability and dispute resolution?

Issue 3: Patentable Subject Matter and Patentability Guidelines

18. Patent protection is available for inventions in all fields of technologies as long as they are not excluded from patentability (Article 27 TRIPS). The exceptions from patentability are defined at the regional and national level and the patentability of software is not harmonized globally. For example, Article 52 of the European Patent Convention (EPC) states that computer programs *per se* shall not be considered patentable inventions. It is generally understood that inventions under the EPC should have a technical character and that so-called computer-implemented invention will benefit from patent protection, while computer programs *per se* will not. In the United States of America, there is no specific exclusion of software from patentable subject matter. Therefore, it may be that certain software or computer program related inventions are considered patentable subject matter in one jurisdiction, while the same inventions might fall outside of the scope of patentable subject matter elsewhere.
19. In the case of AI-generated or AI-assisted inventions:
- (i) Should the law exclude from patent eligibility AI-generated inventions? See also Issue 2(i).
 - (ii) Should AI-generated and AI-assisted inventions be treated in the same way as other computer-implemented inventions? Alternatively, should specific provisions be introduced for AI-assisted inventions, in particular to harmonize the legal approach?

- (iii) Do amendments need to be introduced to patent examination guidelines for AI-generated and AI-assisted inventions? If so, please identify which parts or provisions of patent examination guidelines need to be reviewed.
- (iv) Should AI applications or algorithms be considered computer programs or software and the question whether they represent patentable subject matter be left to national legislation?
- (v) If AI applications or algorithms fall within exclusions from patentability would that incentivize AI applications and algorithms to be kept as secrets and exacerbate the so-called black box problem? Should a harmonized approach be considered?

Issue 4: Inventive Step or Non-Obviousness

20. A condition of patentability is that the invention involves an inventive step or be non-obvious. The standard applied for assessing non-obviousness is whether the invention would be obvious to a person skilled in the relevant art to which the invention belongs.

- (i) In the context of AI-assisted or AI-generated inventions, is it necessary to retain the traditional requirements of inventive step or non-obviousness, which are fundamentally associated with human acts of invention? If so, what art does the standard refer to? Should the art be the field of technology of the product or process that emerges as the invention from the AI application?
- (ii) Should the standard of a person skilled in the art be maintained in the case of AI-generated inventions or should consideration be given to replacing the person by an AI application trained with specific data from a designated field of art?
- (iii) What implications will having an AI application replacing a person skilled in the art have on the determination of the prior art base?
- (iv) Should AI-generated content qualify as prior art?

Issue 5: Disclosure

21. A fundamental goal of the patent system is to disclose technology so that, in the course of time, the public domain may be enriched and a systematic record of humanity's technology is available and accessible. Patent laws require that the disclosure of an invention be sufficient to enable a person skilled in the relevant art to reproduce the invention.

- (i) How do the current rules on disclosure apply to AI-generated and AI-assisted inventions and are they sufficient to meet the underlying policy rationale?
- (ii) What are the issues that AI-assisted or AI-generated inventions present for the disclosure requirement?
- (iii) In the case of machine learning, where outcomes may change depending on the input data and the algorithm adjusts the weights associated with neuron connections to reconcile the differences in actual and predicted outcome, is the disclosure of the initial algorithm sufficient?
- (iv) Would a system of deposit for AI applications or training data, similar to the deposit of microorganisms, be useful?

(v) How should data used to train an algorithm be treated for the purposes of disclosure? Should the data used to train an algorithm be disclosed or described in the patent application?

(vi) Should the human expertise used to select data and to train the algorithm be required to be disclosed?

Issue 6: General Policy Considerations for the Patent System

22. A fundamental objective of the patent system is to encourage the investment of human and financial resources and the taking of risk in generating inventions that may contribute positively to the welfare of society. As such, the patent system is a fundamental component of innovation policy more generally. Does the advent of AI-generated inventions call for a reassessment of the relevance of the patent incentive to such inventions? Specifically,

(i) Should AI-generated inventions benefit from patent protection? If so, would it be enough to incorporate AI-generated inventions in the current legal system or should consideration be given to a sui generis system of IP rights for such inventions in order to adjust innovation incentives for AI? What evidence would be required to justify the need of a new system?

(ii) Is it too early to consider these questions because the impact of AI on both science and technology is still unfolding at a rapid rate and there is, at this stage, insufficient understanding of that impact or of what policy measures, if any, might be appropriate in the circumstances?

COPYRIGHT AND RELATED RIGHTS

Issue 7: Authorship and Ownership

23. AI applications are increasingly capable of generating literary and artistic works. This capacity raises major policy questions for the copyright system, which has always been intimately associated with the human creative spirit and with respect and reward for, and the encouragement of, the expression of human creativity. The policy positions adopted in relation to the attribution of copyright to AI-generated works will go to the heart of the social purpose for which the copyright system exists. If AI-generated works were excluded from eligibility for copyright protection, the copyright system would be seen as an instrument for encouraging and favoring the dignity of human creativity over machine creativity. If copyright protection were accorded to AI-generated works, the copyright system would tend to be seen as an instrument favoring the availability for the consumer of the largest number of creative works and of placing an equal value on human and machine creativity. Specifically,

(i) Do AI generated-works require copyright or a similar incentive system at all?

(ii) Should copyright be attributed to original AI-generated literary and artistic works or should a human creator be required?

(iii) If copyright can be attributed to AI-generated works, can the AI-generated works be considered original?

(iv) If copyright can be attributed to AI-generated works in whom should the copyright vest? Should consideration be given to according a legal personality to an AI application where it creates original works autonomously, so that the copyright would vest in the personality and the personality could be governed and sold in a manner similar to a corporation? How would this interrelate with moral rights?

- (v) If copyright can be attributed to AI-generated works, should related rights extend to sound recordings, broadcasts and performances?
- (vi) If a human creator is required, who are the different parties involved in creating an AI-assisted work and how should the creator be determined?
- (vii) Should a separate sui generis system of protection (for example, one offering a reduced term of protection and other limitations, or one treating AI-generated works as performances) be envisaged for original AI-generated literary and artistic works?
- (viii) In the event copyright cannot be attributed to AI-generated works or that the works are protected by a sui generis system of protection, will this incentivize concealment of the involvement of AI? Should there be a system to prevent such behavior? How could such behavior be detected? Should each work have a log of acts of the creation process leading to a protectable work and transparently identify the acts of each participant?

Issue 8: Infringement and Exceptions

24. An AI application can generate creative works by learning from data with AI techniques such as machine learning. The data used for training the AI application may represent creative works that are subject to copyright (see also Issue 11). A number of issues arise in this regard, specifically,

- (i) Should the use of the data subsisting in copyright works without authorization for machine learning constitute an infringement of copyright?
- (ii) If the use of the data subsisting in copyright works without authorization for machine learning is considered to constitute an infringement of copyright, what would be the impact on the development of AI and on the free flow of data to improve innovation in AI?
- (iii) If the use of data subsisting in copyright works without authorization for machine learning is considered to constitute an infringement of copyright, should an explicit exception be made under copyright law or other relevant laws for the use of such data to train AI applications?
- (iv) If the use of the data subsisting in copyright works without authorization for machine learning is considered to constitute an infringement of copyright, should an exception be made for at least certain acts for limited purposes, such as the use in non-commercial user-generated works or the use for research?
- (v) If the use of the data subsisting in copyright works without authorization for machine learning is considered to constitute an infringement of copyright, how would existing exceptions for text and data mining interact with such infringement?
- (vi) Would any policy intervention be necessary to facilitate licensing if the unauthorized use of data subsisting in copyright works for machine learning is considered an infringement of copyright? Would the establishment of mandatory collective management societies facilitate this? Should remedies for infringement be limited to equitable remuneration?
- (vii) How would the unauthorized use of data subsisting in copyright works for machine learning be detected and enforced, in particular when a large number of copyright works are created by AI? Should regulations require logs of training data to be recorded?

- (viii) If an AI application autonomously generates a work similar to an original work contained in the data used to train the AI application, would this constitute copying and hence infringement? If so, who would be the infringer?

Issue 9: Deep Fakes

25. The technology for deep fakes, or the generation of simulated likenesses of persons and their attributes, such as voice and appearance, exists and is being deployed. Considerable controversy surrounds deep fakes, especially when they have been created without the authorization of a person depicted in the deep fake and when the representation creates actions or attributes views that are not authentic. Some call for the use of deep fake technology to be specifically banned or limited. Others point to the possibility of creating audiovisual works that might allow the deployment of popular or famous performers after their demise in a continuing manner; indeed, it might be possible for a person to authorize such use.
26. Should the copyright system take cognizance of deep fakes and, specifically,
- (i) Is copyright an appropriate vehicle for the regulation of deep fakes?
 - (ii) Since deep fakes are created based on data that may be the subject of copyright, should the deep fake benefit from copyright?
 - (iii) If deep fakes should benefit from copyright, to whom should the copyright in the deep fake belong?
 - (iv) If deep fakes benefit from copyright, should there be a system of equitable remuneration for persons whose likenesses and “performances” are used in a deep fake?

Issue 10: General Policy Issues

27. Comments and suggestions identifying any other issues related to the interface between copyright and AI are welcome. Specifically,
- (i) Is there a hierarchy of social policies that needs to be envisaged that would promote the preservation of the copyright system and the dignity of human creation over the encouragement of innovation in AI, or vice versa? How should a balance be struck between incentivizing human creation and advancing technological progress?
 - (ii) AI applications have the potential to create a plethora of works in a very short time with decreasing investment. Should AI generated works fall into the public domain or benefit from a sui generis right rather than fall into the copyright domain?
 - (iii) Are there any special considerations concerning mixed training data sets that contain both copyright works and works in the public domain?
 - (iv) Are there seen or unforeseen consequences of copyright on bias in AI applications?

DATA

28. Data are produced in increasingly abundant quantities, for a vast range of purposes, and by a multiplicity of devices and activities commonly used or undertaken throughout the whole fabric of contemporary society and the economy, such as computing systems, digital communication devices, production and manufacturing plants, transportation vehicles and systems, surveillance and security systems, sales and distribution systems, research experiments and activities, and so on.

29. Data are a critical component of AI since recent AI applications rely upon machine learning techniques that use data for training and validation. Data are an essential element in the creation of value by AI and are, thus, potentially economically valuable. Comments on appropriate access to data protected by copyright used for training AI models should be included in Issue 8.

30. Since data are generated by such a vast and diverse range of devices and activities, it is difficult to envisage a comprehensive single policy framework for data. There are multiple frameworks that have a potential application to data, depending on the interest or value that it is sought to regulate. These include, for example, the protection of privacy, the avoidance of the publication of defamatory material, the avoidance of the abuse of market power or the regulation of competition, the preservation of the security of certain classes of sensitive data or the suppression of data that are false and misleading to consumers.

31. The present exercise is directed only at data from the perspective of the policies that underlie the existence of IP, notably, the appropriate recognition of authorship or inventorship, the promotion of innovation and creativity, and the assurance of fair market competition.

32. The classical IP system may be considered already to afford certain types of protection to data. Data that represent inventions that are new, non-obvious and useful are protected by patents. Data that represent independently created industrial designs that are new or original are likewise protected, as are data that represent original literary or artistic works. Data that are confidential, or have some business or technological value and are maintained as confidential by their possessors, are protected against certain acts by certain persons, for example, against unauthorized disclosure by an employee or research contractor or against theft through a cyber-intrusion.

33. The selection or arrangement of data may also constitute intellectual creations and be subject to IP protection and some jurisdictions have a sui generis database right for the protection of the investment made in compiling a database. On the other hand, copyright protection is not extended to the data contained in a compilation itself, even if the compilations constitute copyrightable intellectual creations.

34. The general question that arises for the purposes of the present exercise is whether IP policy should go further than the classical system and create new rights in data in response to the new significance that data have assumed as a critical component of AI. The reasons for considering such further action would include the encouragement of the development of new and beneficial classes of data; the appropriate allocation of value to the various actors in the data value chain, notably, data subjects, data producers and data users; and the assurance of fair market competition against acts or behavior deemed inimical to fair competition.

Issue 11: Further Rights in Relation to Data

- (i) Are current IP rights, privacy laws, unfair competition laws and similar protection regimes, contractual arrangements and technological measures sufficient to protect data or should IP policy consider the creation of new rights in relation to data?
- (ii) If new IP rights were to be considered for data, what would be the policy reasons for considering the creation of any such rights? What would be the specific purpose of new rights of protection in relation to data?
- (iii) If new IP rights were to be considered for data, what types of data would be the subject of protection? Which standards should be considered? Would any new IP rights be based on the inherent qualities of data (such as its commercial value) or on protection

against certain forms of competition or activity in relation to certain classes of data that are deemed to be inappropriate or unfair, or on both?

(iv) If new IP rights were to be considered for data, what IP rights would be appropriate, exclusive rights or rights of monetary compensation for use of the data or both?

(v) If new IP rights were to be considered for data, how would any such IP rights affect innovation in the AI field? How would a balance be struck between protection of data and the access to and free flow of data that may be necessary for the improvement of AI, science, technology or business applications of AI?

(vi) How would any new IP rights affect or interact with existing policy frameworks in relation to data, such as privacy, security or unfair competition laws or regulations?

(vii) How would any new IP rights be effectively enforced?

(viii) If no new IP rights were to be considered for data, should the frameworks of current IP rights, unfair competition laws, trade secrets laws and similar protection regimes, contractual arrangements and technological measures be amended in favor of a stronger economic protection of data?

(ix) If no new IP rights were to be considered for data, which other tools could be proposed to ensure that data producers maintain the capacity to decide to whom and under which conditions they can grant access to their non-personal data?

DESIGNS

Issue 12: Authorship and Ownership

35. As with inventions, designs may be produced with the assistance of AI and may increasingly be autonomously generated by an AI application. In the case of the former, AI-assisted designs, computer-aided design (CAD) has long been in use and seems to pose no particular problems for design policy. AI-assisted designs might be considered a variant of computer-aided design and might be treated in the same way. In the case of AI-generated designs, questions and considerations arise that are similar to those that arise with respect to AI-generated inventions (Issue 2), AI-generated creative works (Issue 7) and potential infringement and exceptions (Issue 8). Specifically,

(i) Should the law permit or require that design protection be accorded to a new AI-generated design that has individual character? If a human designer is required, should the law give indications of the way in which the human designer should be determined, or should this decision be left to private arrangements, such as corporate policy, with the possibility of judicial review by appeal in accordance with existing laws concerning disputes over authorship?

(ii) Do specific legal provisions need to be introduced to govern the ownership of AI-generated designs, or should ownership follow from authorship and any relevant private arrangements, such as corporate policy, concerning attribution of authorship and ownership?

(iii) Should the use of the data subsisting in registered designs without authorization for machine learning constitute an infringement of the design right? Should there be explicit exceptions be made the use of such data to train AI applications and what should those exceptions entail? Would any policy intervention be necessary to facilitate licensing if the unauthorized use of data subsisting in protected designs for machine learning were to be considered an infringement of copyright?

- (iv) Should AI-generated unregistered designs be treated analogously to AI-generated registered designs? Are there any special considerations that affect unregistered AI-generated designs?

TRADEMARKS

Issue 13: Trademarks

36. As trademarks do not have the equivalent of an author or inventor, AI does not affect the trademark system in the same way as the patents, designs and copyright systems. However, there may be areas of trademark law that may be impacted by AI.
37. Trademarks are intended to distinguish the origin of goods and services and to prevent consumer confusion. Current trademark law is therefore based concepts of human perceptions and recollection both for determining whether a trademark is registrable and whether it is infringed. For example, applications for trademark registration may be rejected if the applicant's trademark is substantially identical with, or deceptively similar to a trademark registered or applied for by another person in respect of similar goods or closely related services. In order to establish infringement a trademark owner generally needs to show that there is confusion as to the origin of the goods or services. Concepts of human perception and recollection also play a role in the laws passing off, prohibition against commercial misrepresentation of source or origins of goods (US Lanham Act, § 1125) or equivalent.
38. The emergence of AI and e-commerce platforms is changing the nature of the process of buying goods and services. There are ongoing discussions about the way that AI interacts with trademarks in the online environment. For example, AI assistants, search engines, customer service bots and online marketplaces play an important role in shaping the consumer decision-making process. The way that a consumer interacts with the online marketplace through AI may result in the presentation of only a limited number of brands to a consumer, or other alterations in the way that consumers make product selections.
39. In the case of trademarks, questions arise with respect to registrability, infringement and also unfair competition. Questions relating to the use of AI in trademark examination and prosecution are discussed in Issue 15.
- (i) How, if at all, does AI impact trademark law?
 - (ii) Are there any concerns raised by ownership of trademarks with respect to AI?
 - (iii) Do the functions, law and practice of trademarks need to be reconsidered with the increasing use of AI in marketing and the proliferation of AI used by consumers in the context of Internet of Things applications?
 - (iv) Will the use of AI, knowingly or unknowingly, by the consumer for product selection affect brand recognition? Will principles of trademark law, such as distinctiveness, recollection, likelihood of confusion or average consumer need to evolve due to the increasing use of AI? Are these issues for policymakers to consider?
 - (v) Who is ultimately responsible for AI's actions, in particular when recommendations include infringing products?
 - (vi) Does the use of AI raise unfair competition issues? Is this an issue that the IP system needs to address?

TRADE SECRETS

40. Trade secrets are IP rights protecting information that is secret, of commercial value or personal, imparted in a situation of confidentiality and subject to reasonable efforts to protect it. The different national legal approaches to trade secrets are largely unharmonized and their foundations can be found in the laws of tort, privacy, confidentiality or unfair competition.

41. While it can be argued that trade secrets do not represent absolute property rights in the traditional sense, they can generally be an attractive option for IP holders where information is not protectable by traditional IP rights or in cases where lack of disclosure provides a commercial advantage. Given that data plays a crucial role in the development and application of AI (see paragraph 28), the fast evolution of the AI field which may not warrant payment of IP registration fees and the fact that AI is a technology that is generally difficult to reverse engineer, trade secrets are increasingly relied on to protect investment in collecting and curating data and innovations in the AI field.

42. On the one hand, the use of trade secrets in the AI field provides an incentive for AI innovation and gives a framework and legal certainty for information and controlled data sharing between selected parties. Given the often complex global value chains and number of entities involved in the AI field, such as software developers, computer scientists, research institutions, private entities, data producers, and data hosts, trade secrets provide the basis for controlled sharing of otherwise confidential information and fostering collaboration. On the other hand, the lack of disclosure contributes to the so-called black box problem (see also paragraph 19(v)) and potentially provides a hurdle to open data sharing.

43. While the laws of trade secrets or protection of confidential information poses many questions of a general nature, issues that are specific to the arena of AI and IP policy are:

Issue 14: Trade secrets

- (i) Does the current law of trade secrets strike the right balance between protecting innovations in the AI field and the legitimate interests of third parties in having access to certain data and algorithms?
- (ii) Should data and AI applications be protectable by trade secrets or is there a social or ethical interest⁹ to override existing trade secret protection?
- (iii) If data and AI applications should not be protected by trade secrets, should any such exception be limited to certain areas of AI, such as data and applications used in judicial decision-making?
- (iv) If data and AI applications should not be protected by trade secrets, should data and AI applications be protectable by other IP rights?
- (v) If data and AI applications should be protected by trade secrets, should there be a mechanism for evidentiary support and practical mechanisms for preserving the confidentiality of trade secrets?
- (vi) Given the global importance and scope of AI applications, is there a need to harmonize the law of trade secrets at the international level?

⁹ For example, in line with draft guiding principle 6, Transparency, of the UNESCO constituted Ad Hoc Expert Group for the Preparation of a Draft Text of a Recommendation on the Ethics of Artificial Intelligence, 2020, <https://unesdoc.unesco.org/ark:/48223/pf0000373199>.

- (vii) Are there seen or unforeseen consequences of trade secrets on bias or trust in AI applications as trade secrets may increase the lack of reproducibility and explainability of AI?

TECHNOLOGY GAP AND CAPACITY BUILDING

44. The number of countries with expertise and capacity in AI is limited. At the same time, the technology of AI is advancing at a rapid pace, creating the risk of the existing technology gap being exacerbated, rather than reduced, with time. In addition, while capacity is confined to a limited number of countries, the effects of the deployment of AI are not, and will not be, limited only to the countries that possess capacity in AI.

45. This evolving situation raises a considerable number of questions and challenges, but many of those questions and challenges lie well beyond IP policy, involving, for example, questions of labor policy, ethics, human rights and so forth. This present list of issues, and WIPO's mandate, concerns IP, innovation and creative expressions only. In the field of IP, are there any measures or issues that need to be considered that can contribute to reducing the adverse impact of the technology gap in AI?

Issue 15: Capacity Building

- (i) What policy measures in the field of IP policy might be envisaged that may contribute to the containment or the reduction in the technology gap in AI capacity? Are any such measures of a practical nature or a policy nature?
- (ii) What kinds of cooperation mechanisms between countries of similar technological development in AI and IP could be envisioned?

ACCOUNTABILITY FOR IP ADMINISTRATIVE DECISIONS

46. As indicated in paragraph 2(a), AI applications are being increasingly deployed in IP Administration. For example, in the trademark field, IP offices are implementing a range of AI technologies for trademark searching, trademark examination and stakeholder interactions with the aim of improving the efficiency and consistency of the handling and processing of trademark registrations. WIPO's Brand Image Search is one example of an AI tool that can be used for trademark searching in trademark prosecution.

47. The present list of issues is not concerned with questions relating to the development and possible sharing of such AI applications among Member States, which are being discussed in various working meetings of the Organization and in various bilateral and other relationships between different Member States. However, the use of AI in IP Administration also raises certain policy questions, most notably the question of accountability for decisions taken in the prosecution and administration of IP applications.

Issue 16: Accountability for Decisions in IP Administration

- (i) Should AI be allowed for decisions in the prosecution of IP applications? What are the legal questions raised by using AI applications for decisions in the IP prosecution process?
- (ii) Which types of decisions can be determined by AI in IP offices? Are there additional areas that IP offices should explore for the deployment of AI tools IP prosecution and registration?
- (iii) Should any policy or practical measures be taken to ensure accountability for decisions made in the prosecution and administration of IP applications where those

decisions are taken by AI applications? Which principles should AI applications used in the prosecution and administration of IP applications follow (for example, the encouragement of transparency with respect to the use of AI and in relation to the technology used)?

(iv) Do any legislative or regulatory changes need to be envisaged to facilitate or to address the consequences of decision-making by AI applications (for example, reviewing legislative provisions on powers and discretions of certain designated officials)?

(v) Are current appeal mechanisms equipped to deal with appeals due to decisions made by AI?

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