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Attention: AIcallforviews@ipo.gov.uk

International Business Machines Corporation [IBM] thanks the United Kingdom [UK] Intellectual Property [IP] Office [UKIPO] for issuing the consultation "Artificial intelligence and intellectual property: call for views" [Consultation] and welcomes the opportunity to comment. We would be more than happy to continue a dialogue as the UKIPO's work develops further.

As one of the world's leading innovators and patentees, IBM has a keen interest in the developing policy around Artificial Intelligence [AI]. IBM is a global provider of technology products and services and is one of the UK's largest technology employers. For more than a century, IBM has introduced revolutionary technology to the world in a responsible manner, playing a leading role in the development and delivery of AI and has been ranked by IDC as the largest global provider of AI systems (hardware, software and services) for the third successive year[1].

Moving forward, we recommend that the UKIPO tracks related activities from other bodies, such as the World Intellectual Property Organization[2] [WIPO] and the United States Patent and Trademark Office[3] [USPTO] that have attracted a large volume of responses to date, from companies, government bodies, individuals etc.

Further, IBM believes that it is essential that the UKIPO involves key stakeholders in their ongoing discussions, including from the technical community and continues to monitor technological development as well as law and policy in other jurisdictions, such as, Europe, the US and Japan, before enacting changes to AI IP policies and legislation in the UK. To that extent, IBM would welcome further and ongoing discussion with the UKIPO.

In the text below, terms in brackets and quotations are not intended to be construed as definitions, rather, the terms are provided for ease of reading.

[1] https://www.ibm.com/downloads/cas/MK85Y8V3
[2] https://www.wipo.int/about-ip/en/artificial_intelligence/policy.html
[3] https://www.uspto.gov/initiatives/artificial-intelligence

It should also be noted that although some of the questions in this Consultation are nuanced when it comes to AI, other questions may be more broadly applicable to other types of technology in the general computing field - we have cited this in our answers where relevant.

Patents questions

1. What role can/does the patent system play in encouraging the development and use of AI technologies?

IBM is committed to supporting a UK patent system which continues to be robust and motivates innovation. These are features which have been and continue to be critical to the strength of the UK economy.

IBM relies in large part upon the patent system to protect our inventions and help incentivise future innovation. In order to encourage innovation across the board (including, for example, by start-ups and academia), it is imperative that the UK continues to promote a balanced patent system that will benefit patentees, implementers, and the public.

Emerging AI technologies promise to transform the global economy - the AI IP policies (including as related to patents) adopted by the UK will shape whether AI development and uptake in the UK will be comparatively advantaged or disadvantaged.

It is important to note that inventions in the AI field, such as, inventions made with the assistance of AI technology ["AI assisted inventions"], generally are already protectable under current UK patent law (the Patents Act 1977[4]).

In order to further aid applicants and examiners and based on the output of initiatives, such as, this Consultation, IBM encourages the UKIPO to issue guidance relating to patenting AI inventions. For example, as already issued by a number of other IP offices, such as, the European Patent Office (EPO)[5].

2. Can current AI systems devise inventions? Particularly:

Before answering the remaining sub-questions in question (2), we believe that it is critical to note that context and definitions around terms, such as, "AI" itself be discussed and agreed upon upfront in order to have meaningful and consistent policy discussions. It is important to note that it is not purely legal definitions that need to be agreed upon, but that our technical communities are concurrently involved in generating technical definitions in the AI field. Thus, we feel that it is vital to include technical stakeholders in any discussions pertaining to legal definitions.

Even as we carefully define critical terms in AI, we should note that whilst some aspects of AI are well established, other aspects are still developing and emerging – ensuring that we take the time to track and appreciate the technology will help better guide us in identifying any future proposals for change.

We note the following context from the UKIPO in relation to this Consultation: "There is no single agreed definition of artificial intelligence. The government defined AI as: technologies with the ability to perform tasks that would otherwise require human intelligence, such as visual

[4] https://www.legislation.gov.uk/ukpga/1977/37/contents
[5] https://www.epo.org/law-practice/legal-texts/html/guidelines2018/e/g.htm

perception, speech recognition, and language translation. This call for views uses this definition and does not seek to consider the impact of concepts such as an AI superintelligence, or an AI as a legal entity".

Whilst we appreciate the setting of scope for this Consultation, we seek further clarification on the phrase "would otherwise require human intelligence". Many aspects of AI technology require human intervention, for example, AI applications, such as, language translation may indeed require human intelligence in order to filter and tune input and output.

Further, with reference to the UKIPO's context above, if AI superintelligence and AI as a legal entity are out of scope, this does have a bearing on the context of some of the later questions in this Consultation e.g., around the moral case for recognising AI as an inventor in a patent.

(a) to what extent is AI a tool for human inventors to use?

Under the broad umbrella term of AI, examples of technology and tools include supervised and unsupervised learning, machine learning, several different AI mathematical algorithms (e.g., linear regression, decision trees, etc.) and programming concepts, data sets including deep data, validation sets, test sets, training data, and real-time data. AI also includes trained models, coefficients embedded in the trained models, algorithms to train the models, parameters for configuring the models, neural networks and deep neural networks, and the insights gained from output of using a trained model.

One of IBM's guiding principles is that the purpose of AI and cognitive systems is to augment, not to replace, human intelligence. More generally, we believe that a human-centric approach to AI is necessary, where AI is designed and developed in a manner that is aligned with the human values and ethical principles of a society or community it affects[6].

IBM believes that the current generation of AI comprises tools that assist and enhance human endeavours and that AI with the ability to invent without the assistance of a human is a considerable way off.

(b) could the AI developer, the user of the AI, or the person who constructs the datasets on which AI is trained, claim inventorship?

We believe that it is difficult to have detailed discussions around hypothetical scenarios without a framework of fact patterns. Humans interact with AI in many ways and in several other scenarios over and above those listed in this sub-question 2(b).

According to s7(3) of current UK patent law, an inventor is a "deviser" of the invention[7].

Whether a human involved in the listed roles can claim inventorship will depend on e.g., whether the human has created an invention that meets patentability criteria. Thus, although hypothetically, any of the roles listed could result in claimed inventorship, mere developers, user or trainers would not qualify as inventors.

(c) are there situations when a human inventor cannot be identified?

Human intervention/contribution occurs in many steps of the invention creation process (e.g., in order to select input/data sets inputted to an AI system; configure an AI engine; filter outputs of an AI system; use outputs in order to generate an invention).

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[6] https://www.ibm.com/watson/assets/duo/pdf/everydayethics.pdf

[7] https://www.legislation.gov.uk/ukpga/1977/37/part/I/crossheading/right-to-apply-for-and-obtain-a-patent-and-be-mentioned-as-inventor/data.xht?view=snippet&wrap=true

With regards to a scenario where a human is not involved in the creation of an invention, or where any human intervention is very minimal, we do not believe that the current generation of AI has the capacity to autonomously generate an invention ["AI generated inventions"] under current UK patent law.

For example, AI is able to find relationships between many parameters, but cannot independently recognise or confirm the value of such relationships, and thus has no cognition that an invention has been made. Even AI with the ability to adjust algorithmic coefficients – in a sense, reprogramming – has no appreciation of the technical or societal value of those adjustments absent humans.

We believe that AI will remain tools that assist humans, rather than invent independently and autonomously, for a considerable time.

With regards to a scenario where a human is involved, IBM believes that in order to create an invention using current AI, a human does still need to be involved, heavily in most cases, to do so.

We note an emerging debate, where it is asserted that there are scenarios where human intervention was involved, but where no human meets criteria for inventorship. There are further related suggestions that current UK patent law may need to be amended and that, for example, s9(3) of the Copyright, Designs and Patent Act (CDPA) 1988[8] be reviewed in this regard.

Before the UKIPO concludes that there are situations where a human inventor cannot be identified and before any measures are introduced, such as, amending inventorship criteria e.g., by amending current UK patent law, we urge as a first step that input is obtained from the technical community. For example, input and corroboration regarding technical analysis of the intervention/contribution of a human during inventing activities.

Further, with respect to s9(3) of the CDPA, where for computer generated works, "the author shall be taken to be the person by whom the arrangements necessary for the creation of the work are undertaken", we again caution against haste in reaching conclusions. There are several topics that would need to be addressed. Firstly, copyright and patents are different IP rights and care must be taken in asserting analogies[9]. For example, what is meant by the "person by whom the arrangements necessary for the creation of the work are undertaken" with respect to patent law – who would be the appropriate person, under what circumstances, and when? Would this concept encompass any person who contributed to/"arranged" the AI system in question, such as, software developers, users, suppliers, contractors? Should they all be listed as inventors? Would any analogous clause in patent law be able to be overridden by contract? Would a similar amendment to law in other jurisdictions cause an impact on remuneration issues? Further, we note that s9(3) of the CDPA is many decades old and has not been tested in relation to modern AI. We also note similar provisions in other jurisdictions, such as, New Zealand[10] and we recommend that the UKIPO tracks these.

<u>Any</u> changes to current UK patent law on these topics (e.g., inventorship and/or ownership), regardless of how insignificant a particular change may appear at first, could have very many impacts in patent law and on other areas of law and policy outside of IP.

We strongly recommend caution as we proceed with this debate and recommend that all viewpoints and suggestions (including regarding related concepts, such as, ownership) are heard and discussed thoroughly. We would also seek, as first steps, input and corroboration

[8] https://www.legislation.gov.uk/ukpga/1988/48/section/9
[9] Section 49: https://www.bailii.org/ew/cases/EWHC/Patents/2020/2412.html
[10] http://www.legislation.govt.nz/act/public/1994/0143/57.0/whole.html

from our technical communities and discussions, as needed, with the broader legal and policy communities. We urge that the UKIPO and key stakeholders track related issues in other jurisdictions, such as Europe, particularly before changes to legislation and/or policy are advocated.

IBM would be pleased to enter further discussions with the UKIPO and stakeholders regarding this particular debate as needed.

3. Should patent law allow AI to be identified as the sole or joint inventor?

Currently, we do not believe so.

We do not believe that the current generation of AI has the capacity to conceive an invention under current UK patent law.

Furthermore, current UK patent law supports and incentivises human inventors[11].

As we proceed with exploring definitions and policy questions, such as, AI inventorship, we should not blur the lines between AI generated inventions, which have yet to be vetted by the technical community, and AI assisted inventions.

As such, we stress the need for a full analysis on the impact of any proposed changes on current IP protection mechanisms, including current UK patent law.

We also stress that any changes to current UK patent law are given careful consideration with full consultation of key stakeholders, not only from the legal and policy communities, but crucially, in conjunction with the technical community.

A change to inventorship may have many impacts and may in turn be impacted by many other areas of technology, law, policy and broader societal issues of which we should ensure that we have clear insight, such as, liability, infringement, enforcement, ethics and transparency.

It is also important for stakeholders in the UK, particularly post-Brexit, to monitor relevant and emerging legislation and policy across various jurisdictions, such as, the US, Japan, China, Europe and the EU and not only from IP offices, but also from other governmental bodies, such as, the EU Commission and EU Parliament.

In view of the above, we assert that there is no urgency to revise current UK patent law with respect to inventorship.

Indeed, it is prudent to not act in haste. Recognition of AI as an inventor would be a significant policy change impacting trade and competition. As a result, we strongly recommend proceeding deliberately, but also patiently, as the technology matures.

Furthermore, we would like to raise that to some extent, we may be premature in these discussions to advocate any particular direction with regards to legislation and/or policy change.

4. If AI cannot be credited as inventor, will this discourage future inventions being protected by patents? Would this impact on innovation developed using AI? Would there be an impact if inventions were kept confidential rather than made public through the patent system?

[11] https://www.bailii.org/ew/cases/EWHC/Patents/2020/2412.html

Although we should not be quick to determine that AI generated inventions are lost, we must not get ahead of ourselves.

It should be noted that many IP offices worldwide, such as, WIPO are seeing a large growth in AI related inventions[12].

Further, AI assisted inventions are generally already protectable under current UK patent law, subject to e.g., patentability criteria.

Before concluding that innovation is being hampered, relevant issues, such as, whether it would be desirable to change the culture of inventing in order to make available opportunities for AI to invent should be considered in conjunction with the technical community.

With regards to confidential information/trade secrets, whilst we believe the law of trade secrets continues to play a role in intellectual property law generally, we believe that a balance is crucial. The patent system, which is disclosure based, promotes innovation and over reliance on trade secrets may have the effect of diminishing the dissemination of information and collaboration, and slowing technological advancement.

That said, to encourage inventors and applicants to file patent applications, more clarity is welcomed regarding patentability of AI inventions, for example, in the form of guidance from the UKIPO.

5. Is there a moral case for recognising AI as an inventor in a patent?

With reference to our answer in question (2), if AI superintelligence and AI as a legal entity are out of scope of this Consultation, we query the context of this question.

Allowing AI that lacks genuine autonomy to be recognised legally as an inventor raises pragmatic and ethical issues also applicable at a broader, societal level. If AI can enjoy the legal status of an inventor, can it then be liable for infringement? Guilty of a crime? Can AI vote? And, so on. These are far-reaching issues that should not be taken lightly.

Legal recognition of AI as an inventor also requires that we be able to recognise the point at which AI has sufficient autonomy to be said to have conceived an invention. Currently there is no test or accepted set of questions for this type of determination.

6. If AI was named as sole or joint inventor of a patented invention, who or what should be entitled to own the patent?

Under current UK patent law, a patent owner is a natural person (e.g., inventor) or a legal entity (e.g., employer).

As with the discussions around AI inventorship, ownership by AI must also be given careful consideration.

Allowing AI to own an invention or a patent circles back to the uncertainties cited in our answer to question (5) – can AI be liable for infringement, commit a crime, etc.? How would changes to patent ownership impact other types of property ownership? We recommend that AI not be allowed to own an invention/patent unless the ramifications of these uncertainties are satisfactorily resolved.

[12] https://www.wipo.int/edocs/pubdocs/en/wipo_pub_1055.pdf

Some have suggested that programmers and trainers might have an ownership interest in inventions invented by AI, but we believe matters between these parties may best be decided by employment status and/or contract.

Furthermore, we would like to raise that to some extent, we may be premature in these discussions to advocate any particular direction with regards to legislation and/or policy change.

7. Does current law or practice cause problems for the grant of patents for AI inventions in the UK?

Under current UK patent law, AI inventions may fall within a number of areas. As well as subject matter relating to, for example, computer hardware, AI inventions may fall under existing excluded categories, such as, mathematical methods and computer programs[13].

As such, challenges for the grant of patents may be best addressed with the UKIPO undertaking stakeholder dialogue and issuing guidance relating to AI inventions as needed.

Further, we support and encourage harmonisation efforts being undertaken by the UKIPO and other worldwide IP offices e.g., the USPTO, Japan Patent Office [JPO] and the EPO.

Any such efforts would also be useful more generally, with regards to inventions in the broader computing field.

8. Could there be patentability issues in the future as AI technology develops?

The rapid development of AI and an increase in its complexity, may bring challenges for applicants and examiners alike. For example, further clarity may be needed around whether and how the requirements for inventive step are met[14].

Again, such challenges associated with patentability may be best addressed with the UKIPO undertaking stakeholder dialogue and issuing guidance relating to AI inventions as needed.

Any such efforts would also be useful more generally, with regards to inventions in the broader computing field.

9. How difficult do the list of excluded categories in UK law make it to secure patent protection for AI inventions? Where should be the line be drawn here to best stimulate innovation?

Under current UK patent law, AI inventions may fall within a number of areas. As well as subject matter relating to, for example, computer hardware, AI inventions may fall under existing excluded categories, such as, mathematical methods and computer programs.

It is in applicants' interests to gain further clarity with regards to patentability for AI inventions, for example, with respect to technical contribution.

However, such clarity is also useful more generally, with regards to inventions in the broader computing field.

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[13] https://www.gov.uk/guidance/manual-of-patent-practice-mopp/section-1-patentability

[14] https://www.gov.uk/guidance/manual-of-patent-practice-mopp/section-3-inventive-step

We encourage the UKIPO to continue its ongoing outreach and education to applicants regarding these issues and to use insights from its examiners to issue guidance that clarifies patentability as needed, for example, with respect to mathematical methods and computer programs[15].

We also encourage the UKIPO to stay connected with other IP offices, for example, regarding workstreams at the EPO, such as, the recent referral to the Enlarged Board of Appeals, G1/19[16] that relates to patentability of computer implemented simulations and the EPO Guidelines for Examination, which for AI inventions, provides useful references to case law and examples of inventions that are more likely to be patentable[17]. More certainty and harmonisation between the UKIPO and EPO, with regards to, for example, the excluded categories would be beneficial for applicants.

10. Do restrictions on the availability of patent rights cause problems for ethical oversight of AI inventions?

We seek clarity on the meaning of this question e.g., ethical oversight in relation to whom or what (e.g., human inventors or AI)?

Please also cross reference our answer to question (5).

11. Does the requirement for a patent to provide sufficient detail to allow a skilled person to perform an invention pose problems for AI inventions?

Sufficiency may be a challenge depending on the nature of a particular AI invention. However, this may also be true of inventions in the general computing field.

With that in mind, we believe that the existing frameworks in place in terms of legislation, jurisprudence and practice[18] are applied and updated as needed.

We would also encourage the UKIPO to continue its dialogue with applicants and other IP offices, such as, the USPTO, JPO and the EPO.

12. In the future could there be reasons for the law to provide sufficient detail of an AI invention for societal reasons that go beyond the current purposes of patent law?

Currently, details of e.g., a product that is subject to an invention may need to be provided for reasons that go beyond the current purposes of patent law e.g., for liability purposes.

We do not see any immediate need for changes in current UK patent law.

13. Does or will AI challenge the level of inventive step required to obtain a patent? If yes, can this challenge be accommodated by current patent law?

[15] https://www.gov.uk/guidance/manual-of-patent-practice-mopp/section-1-patentability
[16] https://www.epo.org/law-practice/case-law-appeals/pdf/t140489ex1.pdf
[17] https://www.epo.org/law-practice/legal-texts/html/guidelines2018/e/g_ii_3_3.htm
[18] https://www.gov.uk/guidance/manual-of-patent-practice-mopp/section-14-the-application

Factors that are considered in assessing inventive step in the UK, including, the level of skill of a skilled person in the art and the notion of common general knowledge, continue to be refined in practice as influenced by evolving case law in the UK[19].

This is also true in the assessment of inventive step in other jurisdictions, such as, Europe[20].

As more complex technologies are adopted and employed, including AI technology, this may indeed influence such factors in future.

However, we believe that the existing frameworks that are in place are used to analyse and accommodate such evolvements in the first instance and we do not see any immediate need for changes in current UK patent law in this regard.

14. Should we extend the concept of "the person skilled in the art" to "the machine trained in the art"?

With reference to our answers above, particularly for questions (2) – (5), we do not believe that the current generation of AI has the capacity to conceive an invention under current UK patent law.

As such, we do not recommend changes to the concept of "the person skilled in the art" to "the machine trained in the art".

In any case, before any such changes are contemplated and enacted, we stress that the ramifications are fully discussed, and any uncertainties resolved with stakeholders.

15. Who is liable when AI infringes a patent, particularly when this action could not have been predicted by a human?

Infringement is a complex issue that is fact dependent and could involve multiple parties, multiple jurisdictions, multiple IP rights, breach of contract etc. Currently, and with reference to tort law, liability is imposed on legal persons (e.g., humans or legal entities) that are e.g., owners of AI.

Whilst infringement and enforcement by AI that is superintelligent and/or a legal entity are out of scope of this Consultation, such discussions are linked with the topics of inventorship and ownership. For example, if it is determined that AI can be cited as an inventor or owner, then we should carefully consider what this could mean if and when AI engages in infringement – for example, how would the AI pay damages and could the AI even be cognisant/have knowledge that it is infringing? A number of other related areas may also need to be considered, such as, general law, privacy and security. Consultation with the technical community may also be required. We recommend that the UKIPO monitors discussions in these related areas when contemplating any IP-specific perspectives as needed, particularly before any changes to legislation and/or policy are contemplated.

16. Could there be problems proving patent infringement by AI? If yes, can you estimate the size and the impacts of the problem?

With reference to our answer to question (15), infringement is a complex issue that is fact dependent.

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[19] https://www.gov.uk/guidance/manual-of-patent-practice-mopp/section-3-inventive-step
[20] https://www.epo.org/law-practice/legal-texts/html/caselaw/2019/e/clr_i_d.htm

Challenges in proving patent infringement exist currently, including in other types of technology. With that in mind, we believe that the existing frameworks in terms of legislation, jurisprudence and practice are applied and updated as needed.

Copyright questions

IBM would be pleased to continue discussions with the UKIPO as copyright issues evolve.

With regards to this response, IBM would like to focus on issues regarding e.g., exceptions and licensing.

AI is a set of technologies that has risen in importance exponentially over the last few years, particularly with respect to digital transformation. A diverse and numerous set of industries and sectors are already benefitting from its value, and that set continues to grow. AI is having and will continue to have significant economic and societal benefits for the UK.

We recommend that the UKIPO review its positions on data that is subject to copyright with respect to use for commercial purposes by commercial entities, including for Text and data mining [TDM]. This will help to ensure that the U.K. remains "at the forefront of the AI and data revolution"[21].

TDM is a critical tool for use in AI and data analytics solutions. TDM is a form of technology-enabled analytics that allows identification of correlations and useful knowledge from data sets, large and small, in ways that can be processed and harnessed for a myriad of valuable purposes.

Commercial uptake of TDM may be facilitated in a number of complementary ways.

With regards to licensing, one solution that we recommend is the promotion of Open Data Agreements, such as, the Community Data Licence Agreements[22], that specifically contemplate and provide for data analysis by computer-assisted and AI technologies. Standardised data licence agreements can facilitate collaborative approaches for sharing data resources and have the potential to dramatically reduce transaction costs and licensing uncertainty. In particular, some agreements put terms in place to ensure that downstream recipients of data can freely use, modify, and analyse data.

With regards to exceptions, another solution would be to implement an explicit exception to copyright infringement in UK law for commercial TDM purposes. We urge the UKIPO to undertake a review in this regard, particularly as the UK government confirmed in January 2020 that the UK will not be implementing the Directive (EU) 2019/790 of the European Parliament and of the Council of 17 April 2019 on copyright and related rights in the Digital Single Market and amending Directives 96/9/EC and 2001/29/EC (Text with EEA relevance) [Copyright Directive]. The Copyright Directive provides explicit TDM exceptions for both commercial and non-commercial purposes. Once Member States have implemented the Directive, TDM for commercial purposes will be permissible across twenty seven countries in the EU.

Furthermore, globally, in several jurisdictions, such as, Japan and the United States, TDM for both commercial and non-commercial purposes is generally permissible under fair use provisions.

[21] https://www.gov.uk/government/consultations/artificial-intelligence-and-intellectual-property-call-for-views
[22] https://cdla.io/

It is important that the UKIPO gives priority to this matter, particularly post-Brexit, to ensure that it is able to remain competitive with other jurisdictions, which may be perceived to be more AI-friendly.

In drafting and transposing any commercial TDM exception, it is a vital next step that any legal and technical barriers are kept as low as possible, to ensure, for example, that commercial entities (from large corporations, to start ups and SMEs) are able to fully support and engage commercial TDM and that speed-to-market and progress of AI solutions are not hampered, given such solutions are often developed and distributed at scale.

With regards to the broader point of data access, engaging with the technical community is going to be critical – for example, to ensure that any transposition of a commercial TDM exception is kept broad and flexible enough to accommodate improvements and advancement of AI technology. Furthermore, discussions with the technical community regarding measures, such as, data governance and the use of standards would be helpful e.g., for facilitating use of public sector data that is made available.

IBM thanks the UKIPO for the opportunity to comment and is more than happy to be further involved in these continuing discussions.

Respectfully submitted,

[redacted]