

UKRI response to the Intellectual Property Office's 'Artificial Intelligence and IP: copyright and patents' consultation – January 2022

Introduction to UK Research and Innovation (UKRI)

UK Research and Innovation is the largest public funder of R&D in the UK and a steward of the whole system. It convenes, catalyses and invests in close collaboration with others to build a thriving, inclusive research and innovation system. Its constituent councils fund and support activity by academics and businesses engaged in both early and later-stage R&D.

To best represent the views of the different parts of the system on the complex issues raised in this consultation, our response reflects the opinions of both the UK-based innovation and research communities, as presented by Innovate UK and The Science and Technology Facilities Council (STFC) respectively. The councils differ in their ranking of options on account of their extensive experience of working with and supporting individuals, institutions, and commercial entities at their respective positions on the R&D spectrum.

Copyright protection for computer-generated works without a human author. These are currently protected in the UK for 50 years. But should they be protected at all and if so, how should they be protected?

Options

Option 0	Make no legal change
Option 1	Remove protection for computer-generated works
Option 2	Replace the current protection with a new right of reduced scope/duration

1. Please rank these options in order of preference (most to least preferred) and explain why:

Innovate UK – the UK's innovation agency, which helps UK businesses to grow through innovation – ranks the options as follows:

- 1st Rank – Option 2
- 2nd Rank – Option 0
- 3rd Rank – Option 1

Innovate UK finds that the current copyright protection for computer-generated works without manual authoring is derived from those with human authors. These original copyright laws were designed to attribute the appropriate value to an intellectual creation, and to reward the author by incentivising them to produce further content. Since these drivers are not the same as that for *computer-generated works*, their corresponding protection needs to be differentiated. Unlike other major countries, the UK is a global leader in creative content, which generates £110bn¹. It is, therefore, of paramount importance that these protections are significantly different.

Innovate UK further believes that the correct approach is to provide an appropriate level of protection which reflects the effort or investment put into computer-generated works. This is

¹ <https://www.gov.uk/government/news/uks-creative-industries-contributes-almost-13-million-to-the-uk-economy-every-hour>

why it ranks 'Option 2: Replace the current protection with a new right of reduced scope/duration' first. This protection should be significantly less than that provided for work involving a human. This opinion is based on two key points:

- Human creativity generates significant economical and societal benefit for the UK. We should aim to incentivise it over other processes which disregard the human.
- Utilising copyrighted material to train AI is currently a grey area. This should be taken into account when attributing copyright protection on computer-generated works.

Option 1 is its least preferred option. Although it may benefit some sectors, it would have a negative impact on others. Option 0 – the status quo – is preferable to Option 1. If pursuing this route, it is envisaged that copyright will have to be regularly reviewed, maybe every 3 to 5 years. This is to explore how advances in technology have impacted the market, and to ensure IP policies continue to provide adequate protection in the evolving UK economy. Therefore, these two options are significantly less desirably to Option 2.

STFC, which operates in the research space, finds the following ranking to be appropriate:

- 1st Rank – Option 0
- 2nd Rank – Option 2
- 3rd Rank – Option 1

STFC believes that the current UK legislation is fit for most purposes. Maintaining the status quo would be ideal through Option 0. Option 2 would be unnecessary for normal computer-generated works. However, in the context of AI, it may have merit as the programmer's contribution in relation to the work in question is much smaller than a standard program wherein the programmer sets up all the code and parameters. Option 1, the STFC feels, would put the UK on a similar footing with the USA, which is not preferable.

2. Do you currently rely on the computer-generated works provision? If so, please provide details of the types of works, the value of any rights you license and how the provision benefits your business. What approach do you take in territories that do not offer copyright protection for computer-generated works?

STFC does. Their Artificial Intelligence and High-Performance Computing Centre produces computer-generated works and, therefore, they rely on copyright protection. Using such works in some countries like the US can present challenges, as the latter does not define the author for computer-generated works. Interactions of this kind with foreign jurisdictions are at present minimal.

3. If we introduce a related right for computer-generated works, as per option 2, what scope and term of protection do you think it should have? Please explain how you think this scope and term is justified in terms of encouraging investment in AI-generated works and technology.

For protection to be provided, the "author" of the computer-generated works would have to evidence that their AI was not trained utilising unauthorised copyrighted material. The protection would last for approximately five years (according to Innovate UK) or 10-15 years (according to STFC). This would incentivise investment into AI and remain reflective of the rapid speed of technological advances in the sector. A shorter time period is justified to incentivise others to modify the content (human or computer generated) after the protection has lapsed. This would allow more parties to innovate and benefit from the original work. The scope may be similar to that of copyright.

4. What are your views on the implications of the policy options and of AI technology for the designs system?

Reducing the term of an intellectual property right in a computer-generated work to 10-15 years, thereby bringing it into line with UK unregistered design rights (under The Copyright, Designs and Patents Act (CPDA) 1988), would remove complications with respect to designs generated by AI. All AI-generated designs would be treated as industrial in nature and made to fall within the design right regime. AI is already incorporated into some design programmes, which allows faster user alignment to design variables without impairing creativity. This has empowered the designer without disrupting the market. As with copyright, it is appropriate that others' protected designs are not used to train the AI with permission.

5. For each option, what are your views on the risk that AI generated works may be falsely attributed to a person?

While STFC feels that the risk is present across all three options, Innovate UK feels that the risk is greatest with Option 1, as falsely attributing to a person would lead to significantly greater protection. Conversely, Innovate UK find the risk associated with Option 0 to be minimal. However, the most likely outcome is that there will be limited human input to justify it being 'a tool to assist a human creator', which would allow it to fall under general copyright protection without falsifying any statements or records.

Licensing or exceptions to copyright for text and data mining, which is often significant in AI use and development.

Options

Option 0	Make no legal change
Option 1	Improve licensing environment for the purposes of TDM
Option 2	Extend the existing TDM exception to cover commercial research and databases
Option 3	Adopt a TDM exception for any use, with a rights holder opt-out
Option 4	Adopt a TDM exception for any use, which does not allow rights holders to opt out

6. If you license works for TDM, or purchase such licences, can you provide information on the costs and benefits of these? For example, availability, pricing, whether additional services are included or available, number and types of works covered by the licence. Please also consider the benefits that TDM provide to you and your colleagues.

STFC's work is mostly for non-commercial purposes, and therefore falls under s.29 of CDPA 88. STFC does, however, undertake commercial work for third parties. More information regarding licences can be obtained from STFC's High-Performance Computing departments.

7. Is there a specific approach the government should adopt in relation to licensing?

There is significant untapped economic and societal benefit to be gained from text and data mining. Therefore, it is important that we do not price out our most promising commercial innovators in this space. The barrier to entry should be reduced and more holders of rights should be incentivised by government to share their content under these licensed agreements.

Extending the scope of exceptions for specific commercial purposes would also be beneficial economically. If an exception is not possible, some form of equitable remuneration scheme that is easy for the user should be implemented.

8. Please rank the options in order of preference (most to least preferred) and explain why.

The following ranking holds good for Innovate UK:

- 1st Rank – Option 4
- 2nd Rank – Option 3
- 3rd Rank – Option 2
- 4th Rank – Option 1
- 5th Rank – Option 0

The above order ranks the options according to how accessible they would be to the research and innovation community. Therefore, the preferred option for Innovate UK would be to Adopt a TDM exception for any use, which does not allow rights holders to opt out. This would meet the future demands of AI and big data. The UK must ensure that copyright is not an obstacle for AI.

STFC ranks the options differently, reflecting the fact that it primarily supports the research community undertaking earlier stage R&D activity:

- 1st Rank – Option 2
- 2nd Rank – Option 4
- 3rd Rank – Option 1
- 4th Rank – Option 3
- 5th Rank – Option 0

For STFC, Option 2 would be most desirable. However, Option 4 (for commercial purpose only) would also be acceptable. In STFC's view, Option 1 and Option 3 risk complicating the use of works for training AI.

9. If you have experience of the EU exception with opt out for rights holders, how has this affected you?

N/A

10. How would any of the exception options positively or negatively affect you? Please quantify this if possible.

STFC finds that *Option 0* would have no effect, while *Option 2* would have a positive impact. They would be allowed to use AI trained on such works in commercial licences. *Option 3* would make STFC's processes very complicated and expose them to large risks.

Patent protection for AI-devised inventions. Should we protect them, and if so, how should they be protected?

Options

Option 0	Make no legal change
Option 1	"Inventor" expanded to include humans responsible for an AI system which devises inventions

Option 2	Allow patent applications to identify AI as inventor
Option 3	Protect AI-devised inventions through a new type of protection

11. Please rank these options in order of preference (most to least preferred) and explain why?

Reflecting the perspective of the business innovation community, Innovate UK's ranking order is as follows:

- 1st Rank – *Option 3*
- 2nd Rank – *Option 2*
- 3rd Rank – *Option 0*
- 4th Rank – *Option 1*

In the current landscape, developing AI systems requires significant investment, yet patent protection for the AI technologies themselves is hard to obtain and enforce. The fact that it is possible to reverse engineer several AI systems – allowing for outputs to be copied and duplicated – leads many businesses to withhold investment in novel R&D. Without patent protection for AI-generated inventions, there would likely be an increased use of trade secrets, which would decrease the flow of information, stem technological advancement and disincentivise investment in AI technologies.

AI-generated inventions therefore require protection to ensure continued investment in the development of AI technologies. Innovate UK's preferred option is to establish a new type of protection that would incentivise innovation. This would be a fundamental change, however one that the UK should be taking a leading role in given the strength of both our legal and AI ecosystems.

Innovate UK is not supportive of Option 1, as mandating that a human be named where an AI system has generated the output is detrimental to human inventors in genuine co-invention scenarios.

STFC ranks the options differently:

- 1st Rank – Option 0
- 2nd Rank – Option 3
- 3rd Rank – Option 2
- 4th Rank – Option 1

STFC feels that Option 0 maintains the status quo, and gives more time to understand and consider issues. Option 3 could act as a translational right, until some variation of Options 0-2 is chosen. It also supports AI-led innovation in the UK for the time being, and does not interfere with activities such as foreign filing strategies. Option 2 takes a more heads-on approach and accepts reality to provide greater transparency than Option 1 and 0. Negative effects could lead to damaging SMEs, UK companies and potentially the UK economy. This is because the main entities that are at the stage of AI technological development are large international companies corporations, predominantly US and Chinese ones. Option 1 does not reflect how AI is developed or used in industry, while also reducing transparency.

12. Would the changes proposed under Options 1, 2 and 3 have any consequential effects on the patent system, for example on other patentability criteria?

Broadly speaking, funding bodies and research councils have certain unique IPR mechanisms in place for circumstantial relevance. For example:

- a. The Engineering and Physical Sciences Research Council (EPSRC) makes no claim to the intellectual assets (IA) arising from the research and training that it supports. The responsibility for managing intellectual assets is delegated to the funded organisation. It is expected that appropriate arrangements between partners in a project would be in place to make sure there is a suitable return to the university and researchers. Arrangements should ensure that the ownership returns to the university if it is not exploited by the business partner in an agreed period, and that there should be no significant restrictions on researchers' future research activities.
- b. At the Natural Environment Research Council (NERC), if the IP results from research supported by standard grants to universities and other eligible bodies, those bodies retain the IPR. If the IP comes from science-budget-funded work in NERC research centres, NERC owns it. In NERC delivery partner organisations, the organisation receiving the funding normally owns it. NERC reserves the right to retain – for a limited period – an exclusive right to exploit IP from NERC-funded programmes in universities, research centres and other eligible bodies, for the benefit of grant holders and the UK. This is to avoid cases where multiple ownership of IP might put people off trying to make use of it.
- c. MRC does not own any IP generated by research it funds unless it is conducted in its institutes and units. Instead, this belongs to the researchers and universities doing the work. LifeArc is responsible for managing MRC intellectual property and works to exploit MRC's scientists' research findings to generate income that then funds further research.

Making significant changes would be asking for these Councils to follow a common IPR model which might have major consequential effects for UKRI.

In Innovate UK's opinion, which reflects those of the business innovation community it serves, Option 0 would have a minimal impact in the short term, but would affect the UK's international standings in the long term with the UK; Option 1 would be detrimental to human inventors in genuine co-invention scenarios; Option 2 and Option 3 would have significant impacts to the patent system.

For STFC, Option 0 would have minimal effect. However, there is a risk that incorrect inventor attributions in bad faith may be made. Nevertheless, as this would severely affect the patent holder if discovered, the risk of it occurring is low. This also gives the UK time to study AI-led inventions and make a more informed decision.

- Option 1 would not be helpful, as AI systems may be developed by a contractor for the assignee. The contractor may have no knowledge of the technical field of the AI invention. This is also the case when AI is developed in-house. The developer may not be knowledgeable in the field of invention. This leads to inaccurate inventorship and (in the former case of contractor made AI) inaccurate ownership rights.
- Option 2 seeks to take the monopoly of inventive skill away from humans. In doing so, it addresses the reality of the situation and accepts that AI can invent. It may also incentivise investment in AI and lead to faster technology development. However, there are several significant downsides to this option.

Firstly, this option risks allowing GB-patented inventions to be developed exclusively by a few, mainly non-British corporates, while at the same time removing them from the reach of SMEs, individual inventors and other new entrants. SMEs and individual

inventors will have to first invest in AI capability before they can start competing with larger players in their technical area.

A second risk is the devaluation of the patent system. AI systems could plausibly generate such large numbers of patentable inventions that they overload the applications and approvals processes and, by extension, the judicial system. It would be akin to an extreme version of standard-essential patents (SEP). A limited number of companies possessing such a volume of patents would have the effect of driving out competition. Although increasing filing fees is held up as a means of keeping the number of filings in check, it will likely not act as a sufficient deterrent for companies such as Google, which have large patent budgets.

Lastly, this option could lead to issues during foreign filings, at least until such time as legislation governing AI inventions is harmonised at a global level.

- Option 3 would be an interesting direction, especially as a transitional solution. This would give UK industry and the IPO some time to understand the AI contributions to innovation better and allow such technology to mature. There already exists a very UK specific right (unregistered UK design rights, and, to a much smaller extent, the supplementary unregistered design rights) so adding a new right should not be too problematic. This new right could have a shorter life than a full patent, possibly along the lines of European utility models. This may prevent skewing the patent landscape further in favour of large international corporates.

For Option 1 and 2

13. If UK patents were to protect AI-devised inventions, how should the inventor be identified, and who should be the patent owner? What effects does this have on incentivising and rewarding AI-devised inventions?

UKRI delegates responsibility for managing intellectual assets developed from the research, development and training it supports to funded organisations (where external to UKRI). UKRI expects that a collaboration agreement is set at the outset of a project before any IP is generated. As this inevitably requires human involvement, AI-devised inventions might also require identifying humans responsible for an AI system which creates such inventions.

STFC further finds that Option 1 would push industry to develop AI solutions in-house as external developers or contractors would otherwise end up as inventors and have claim to the inventions. Option 2, on the other hand, would incentivise AI development and use in industry. This could also fasten the pace of innovation and product development, which would be at the cost of out-competing small and medium companies, whose only comparable strength is in innovation.

Identifying inventors would be more transparent as the risks of disclosing AI as the inventor would be minimal in such a supportive legislative environment. Nevertheless, assignees may face issues during foreign filings in the absence of a harmonised patent system, which could curb transparency.

14. In considering the differences between options 1 and 2, how important is it that the use of AI to devise inventions is transparent in the patent system?

STFC believe that *Option 1* would greatly reduce transparency as it could lead to entitlement claims from third party AI developers. This in turn could have a damaging effect on standalone AI development firms and centres, like the Hartree Centre. *Option 2* would lead

to greater transparency, as well as the better adoption of AI by SMEs through grant funded programmes such as those provided by UKRI.

15. Would the UK adopting option 2 affect your global patent filing strategy, if so, how?

The approach to IP across UKRI's councils varies considerably. This is mostly based on whether the councils own research institutes or not. Adjusting the system so that UK patents protect inventions devised by AI without any requirement to name a human inventor would complicate the existing range of functional mechanisms within the councils.

If the UK was the sole market for its technology, or it were operating a strategy of defensive publication, then it would make sense for an organisation to file an AI invention in the UK. If it had an AI Inventor, and the invention in question had a wider potential market than just the UK, an organisation might be encouraged to make better use of trade secrets, particularly for novel processes and inventions that cannot be reverse engineered.

There is a possibility that permitting the filing of AI inventions in the UK could lead to a deluge of published GB inventions that wipe out novelty and inventiveness globally in many fields. This could precipitate a fundamental change in businesses' approach to patents, as they may decide that they are no longer a worthwhile investment. Conversely, countries not in favour of AI inventions may end up being counterfeiting centres in the absence of any patent protection putting a huge strain on customs overseeing imports from countries where AI inventor rights are accepted.

For Option 3

16. What term and scope of protection should a new right offer?

Ideally, this should have a lower scope of protection than a normal patent. Shorter term and narrower claim interpretation possibly. Using utility models as a template may be useful.

17. What should the criteria for grant of a new right be and why? Particularly should it:

a. Replicate the current requirements for a patent?

Yes, requirements of novelty, inventive step, industrial applicability and sufficiency should ideally remain. However, given lower scope of protection (in terms of claim construction, more literal perhaps) or shorter term (6-10 years) it might be reasonable to require a lower threshold for inventive step.

As for entitlement requirement, by virtue of employment in case of patents, this new right could have automatic entitlement flowing to organisation or person in ownership of the AI.

b. Set a different bar for inventive step?

As discussed above, but if high volumes are anticipated, a formal examination may be sufficient. For example, certain territories like South Africa and France do not carry out substantial examination for registration. Substantive examination can be carried out in event of litigation.

c. Be an automatic or registered right?

Registered right.

General

1. What role does the IP system play in the decision of firms to invest in AI?

IP rights are used by companies to protect their investments in innovation, where the company is large enough to defend and enforce IP rights that are enabled. This creates a better environment to sell their products and services, and gives the opportunity for higher profits. IP ownership is especially important if the company is raising capital from venture capitalists.

The real value is created by bring commercially viable products or services to the marketplace that is the primary goal of innovation. Often a small part of this can be protected by IP and that is protection from copying or imitating. The main benefit of AI is, however, the creation of new products and services integrated into organisations and businesses that can scale with market demand.

Much AI is not covered by the IP framework. More firm-level data is needed to understand the link between IP and AI adoption. More broadly, IP legislation impacts innovating SMEs and larger firms differently. The current system presents some barriers to enjoying formal IP protection. Small firms often have insufficient human resources to undertake the groundwork for IP acquisition, cannot afford patents, or have an inadequate knowledge of IP rights and procedures². Paradoxically, improved formal IP protection allows smaller firms to generate greater returns on the innovations.

AI is mostly used to boost productivity in-house, for example in Big Tech firms, banks etc. Companies that use AI to bring in revenue from external clients often use a consultancy model, building bespoke solutions for clients from free open source software.

2. Does the first mover advantage and winner-take-all effect prevail in industries adopting AI? How would this affect the impact of the policy options proposed on innovation and competition?

There is a significant network and scale effect with platform business models that are enabled by AI technologies. This is because AI or machine learning (ML) technologies that are often at the heart of these business models improve when fed large amounts of data, allowing the organisation to optimise the business and establish a strong competitive advantage. For example, if 90% of all data passes through the organisation platform and the nearest competitor is 2%, the ML for the larger market share will persist as it will be fed by significantly more data. If the market share is more evenly spread, then the relative advantage becomes less apparent.

² [Small firms and formal intellectual property protection: A paradox? - Enterprise Research Centre](#)

Given there are large tech companies in AI technologies, strengthening AI IP protection would initially cause a steep increase in research to create and protect IP related to AI with the intention of protecting the existing interests of the large tech industry.

For industries adopting AI, the motivation to do so has less to do with establishing a first-mover advantage, and more to avoid being consistently left behind. Ideas are portable in AI; once one team does something new, it can be easily replicated by other teams, such as DeepMind with reinforcement learning or OpenAI with natural language processing (GPT-3). The risk for firms is that they avoid adopting AI for long enough that a more tech-savvy firm displaces them.

3. How does AI adoption by firms affect the economy? Does the use of AI in R&D lead to higher productivity?

AI has a huge effect on productivity, and it brings a number of potential economic benefits. As a rule of thumb, any activity that a human can do in a couple of seconds (driving, reading, office productivity etc.) can now be done by AI.

AI adoption is a technological driver of productivity within companies, but this only affects the economy when it is adopted and integrated into better products and services that can be scaled and exported across the globe. The adoption of AI technology is a core competency for a company, and this requires the organisation to invest in skills, software and infrastructure but most importantly integrate this into their organisation in a way it can evolve.

AI can improve the productivity of R&D by digitally transforming the process of discovery. However, when it comes to commercial organisations, productivity is about serving customers more efficiently with services they will pay for.

AI can increase market capitalisation, particularly in larger tech-based firms. The lag on AI adoption is felt more in smaller businesses. AI patents have increased exponentially since the early 21st century (J curve) but detecting and measuring the link to productivity is not clear enough to link AI adoption to increased productivity³.

4. Do the proposed policy options have an impact on civil society organisations? If so, what types of impacts?

Civil society organisation like any organisation should be optimising their structures to deliver against their purpose. They are likely to pay more for off-the-shelf software and be prevented from building own solutions due to access to talent and IP.

³ [Artificial intelligence and productivity: an intangible assets approach - The Productivity Institute](#)