

# Artificial intelligence and intellectual property: copyright and patents—a response by the CREATE Centre to the UK Intellectual Property Office’s open consultation

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## 1. Introduction

‘Artificial intelligence (AI) is a transformative technology, which is already revolutionising many areas of our lives. Unleashing the power of AI is a top priority in the plan to be the most pro-tech government ever.’ Thus opens modestly the consultation on *Artificial Intelligence and Intellectual Property: Copyright and Patents*, conducted by the UK Intellectual Property Office (IPO) between 29 October 2021 and 7 January 2022.<sup>1</sup>

The Consultation sought ‘evidence and views’ on three specific areas:

- 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?
- Licensing or exceptions to copyright for text and data mining (TDM), which is often significant in AI use and development.
- Patent protection for AI-devised inventions. Should we protect them and if so, how should they be protected?

We consider each of these legal issues in turn, reproducing the given policy options at the beginning of each section, even where we would have preferred to frame the discussion differently. We then proceed to assess the existing evidence. The text is an

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This research was supported by the AHRC Centre of Excellence for Policy & Evidence in the Creative Industries (PEC) (reference: AH/S001298/1).

<sup>1</sup> UK Intellectual Property Office, *Artificial Intelligence and Intellectual Property: Copyright and Patents* (29 October 2021). Available at <https://www.gov.uk/government/consultations/artificial-intelligence-and-ip-copyright-and-patents/artificial-intelligence-and-intellectual-property-copyright-and-patents> (accessed March 1 2022).

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## This article

- The UK Intellectual Property Office consulted between October 2021 and January 2022 on policy options for intellectual property (IP) law interventions that could ‘secure the UK’s position amongst the global AI superpowers’, in line with the government’s national AI Strategy (September 2021) and the vision ‘to make the UK a global hub for innovation by 2035’ (UK Innovation Strategy, July 2021). This article reproduces the submission by the Copyright and Creative Economy (CREATE) Centre at the University of Glasgow. We show that policymakers are in a difficult position to assess reform proposals relating to artificial intelligence (AI) and IP because evidence remains scarce.
- With respect to computer-generated works and patent inventorship, we urge caution. There is no evidence that new rights are needed. The onus of proof needs to lie with the proponents of much discussed proposals, such as offering AI copyright authorship in the guise of computer-generated works or granting AI inventorship under patent law. With respect to text and data mining (TDM), we see a straightforward opportunity to stimulate UK innovation and improve the transparency

of AI systems by opening up the current ‘Hargreaves’ exception to all users (Copyright, Designs and Patents Act 1988: s 29A, Copies for text and data analysis for non-commercial research).

- More generally, the UK’s research and innovation environment would in our view benefit from a technologically neutral, open-ended user exception (akin to the copyright doctrine of ‘fair use’ in the USA).

authentic reproduction of CREATE’s submission to the Consultation.

In the structured format of the Consultation, there was no space to evaluate fully the evidence for our preferred policy option of a technologically neutral, open-ended user exception (‘fair use’).<sup>2</sup>

## 2. Computer-generated works

### Policy options offered by the UK IPO

| Computer-generated works |   |
|--------------------------|---|
| 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 |

### Assessment

With no counterpart in most jurisdictions, s 9(3) of the Copyright, Designs and Patents Act 1988 (CDPA) is rather unique, if not problematic. Indeed, the effective operation of this provision may depend upon other aspects of copyright law which, following Brexit, remain unsettled. By providing 50-year protection to ‘authorless’ computer-generated literary, dramatic, musical or artistic (LDMA) works, s 9(3) poses the complex legal question of what originality standard should be applied. There is an apparent inconsistency with the EU standard of ‘an author’s own intellectual creation’, which relies on creative choices made by an individual,<sup>3</sup> for example. The

standard of ‘originality’ applicable to computer-generated outputs that do not reflect human creative input is a matter for UK law alone.<sup>4</sup>

In more than 30 years, s 9(3) was only ever considered in a single court decision,<sup>5</sup> which did not address the originality issue. Determining the author of computer-generated works—that is, the ‘person by whom the arrangements necessary for the creation of the work are undertaken’—is no straightforward matter either. In *Nova Productions*, the Court of Appeal found such a person to be the author of the computer program rather than the user. However, this decision concerned a simple two-dimensional video game, offering limited guidance on the issue of AI-assisted outputs. Furthermore, as the experience with other types of subject matter (eg sound recordings) suggests, the notion of ‘arrangements necessary’ is not resolved, nor is it clear if the ‘person’ making such arrangements can be a legal entity (ie a firm).<sup>6</sup>

The introduction of a related right of reduced scope and duration referred to as option 2 may lead to an issue of cumulation, with the same subject matter attracting rights of different kind, as the recent experience with databases suggests. The potential costs of additional IP rights typically are of two kinds: higher prices and loss of innovation. In the UK, the Hargreaves (2011) and Gower (2006) Reviews recommended making the policy process more transparent and rigorous.<sup>7</sup> IP rights, once created, have proved almost impossible to remove.<sup>8</sup>

*Leisure*, C-403/08 and 429/08, EU:C:2011:631; *SAS Institute Inc v World Programming Ltd*, C-406/10, EU:C:2012:259.

- 2 We understand that the UK government is considering the matter but may treat it as too politically charged for an open consultation at this stage. For the record, we consider a well-conceived ‘fair use’ exception to be an author-friendly provision compatible with measures relating to remuneration and contracts (which we have supported in different contexts). Cf Séverine Dusollier *et al.* ‘Comment of the European Copyright Society Addressing Selected Aspects of the Implementation of Articles 18 to 22 of the Directive (EU) 2019/790 on Copyright in the Digital Single Market’ (2020) 11 *Journal of Intellectual Property, Information Technology and Electronic Commerce Law* 133.
- 3 See for example *Infopaq International A/S v Danske Dagblades Forening*, C-5/08, EU:C:2009:465; *Football Association Premier League Ltd v QC*

- 4 Lionel Bently *et al.* *Intellectual Property Law* (5th edn Oxford University Press 2018) 118.

- 5 *Nova Productions Ltd v Mazooma Games Ltd* [2007] EWCA Civ 219.

- 6 CDPA s 9(2) defines the producer as the author of a sound recording. Under CDPA s 178, ‘producer’, in relation to a sound recording or a film, means the person ‘by whom the arrangements necessary’ for the making of the sound recording or film are undertaken. Case law indicates that financial and organizational inputs are important (*Beggars Banquet Records v Carlton TV* [1993] EMLR 349). This can range from access to venues to contracting performers. In *Bamgboye v Reed* [2004] EMLR 5 para 85, Hazel Williamson QC (sitting as a Deputy Judge of the High Court) said: ‘It seems to me the question can be summarised in this sense: Looking at the cases, and remembering that it is always a question of fact. Who was it who got the recording made (to put it in a colloquial way)?’ Unfortunately, no clearer notion of what are ‘arrangements necessary’ has emerged since.

- 7 Andrew Gowers, *Gowers Review of Intellectual Property* (2006); Ian Hargreaves, *Digital Opportunity: A Review of Intellectual Property and Growth* (2011). Recommendation 1 of the Hargreaves Report reads: ‘Government should ensure that development of the IP system is driven as far as possible by objective evidence. Policy should balance measurable economic objectives against social goals and potential benefits for rights holders against impacts on consumers and other interests. These concerns will be of particular importance in assessing future claims to extend rights or in determining desirable limits to rights.’

- 8 Martin Husovec, ‘The Fundamental Right to Property and the Protection of Investment: How Difficult Is It to Repeal New Intellectual Property Rights?’ in Christophe Geiger (ed) *Research Handbook on Intellectual Property and Investment Law* (Edward Elgar 2020) 385–405.

In a period of rapid technological and industrial change, the standards of evidence required therefore must be particularly high. A fundamental point relates to the onus of proof. Advocates of new rights need to evidence what the potential costs are, who will carry them and that the costs are necessary and proportionate to the claimed benefits.

The UK government should carefully consider whether the complex legal questions attendant on AI outputs must really be addressed at such an early stage, as an attempt to anticipate issues that have not emerged yet. There is no conclusive evidence showing that the current copyright framework provides suboptimal incentives for the creation of AI-generated works, let alone the existence or sudden emergence of market failure requiring legislative intervention. The UK IPO's Impact Assessment is framed by a utilitarian discourse which, if unaccompanied by market-based evidence, may seem all too speculative.

At present, the role of most AI tools is largely limited to the execution stage of creative production, with human authors retaining control over the conception and redaction phases.<sup>9</sup> From a creative and legal perspective, AI applications such as Grammarly are not very different from editing or motion graphics software such as Adobe Photoshop or After Effects. In all such cases, the computer (or AI) carries out the work under the instruction and control of a (human) creator. UK copyright already affords protection to outputs generated by or through such applications so long as they fall within one of the categories of protected works and meet the originality standard.<sup>10</sup>

There is no real need for a dedicated, *sui generis* provision dealing with copyright subsistence in computer-generated works. Unless strong evidence emerges that AI users, developers and businesses indeed do rely on s 9(3), we recommend that the UK government removes protection for computer-generated works (**Option 1**).

### 3. Text and data mining (TDM)

#### Policy options offered by the UK IPO

| Text and data mining (TDM) |   |
|----------------------------|---|
| 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 |

#### Assessment

Extracting information from copyright-protected materials should not be considered a copyright-relevant act. We, therefore, recommend that the UK should avail herself of recently acquired post-Brexit freedoms to foster innovation by adopting a TDM exception for any use (**Option 4**). In addition, the introduction of a technologically neutral, open-ended exception (akin to the fair use doctrine in the USA) should be explored.

With regard to TDM, more evidence is available than for the issue of computer-generated works. Indeed, empirical research indicates that in jurisdictions with more permissive copyright frameworks<sup>11</sup> and robust research exceptions, more data mining-related research is conducted.<sup>12</sup> Higher firm revenues in information industries, computer system design and software publishing as well as increased, higher-quality scholarly output appear to be found in countries with more open user-friendly provisions such as the US fair use clause.<sup>13</sup> The scope of the UK exception for text and data mining (s 29A CDPA) is rather narrow and uncertain, creating confusion, for example in the context of the widespread practice of data scraping.<sup>14</sup> While Option 4 seems the most conducive to innovation in research and business, we would favour two other options which the UK government may not have considered: (i) excluding from the scope of exclusive rights TDM and other acts of extracting informational

9 P Bernt Hugenholtz and João Pedro Quintais, 'Copyright and Artificial Creation: Does EU Copyright Law Protect AI-Assisted Output?' (2021) 52 *International Review of Intellectual Property and Competition Law* 1190.

10 While there are some AI systems—such as the GP-T2 and GP-T3 text generators developed by OpenAI—that can generate creative outputs with minimal contribution from individuals, this does not change the analysis. For an example of GP-T3, see Opinion Artificial Intelligence, 'A Robot Wrote This Entire Article. Are You Scared Yet, Human?' *The Guardian* (8 September 2020) <https://www.theguardian.com/commentisfree/2020/sep/08/robot-wrote-this-article-gpt-3> accessed 23 December 2021. We agree with Goold that s 9(3) 'is either unnecessary or unjustifiably extends legal protection to a class of works which belong in the public domain'. See Patrick Goold, 'The Curious Case of Computer-Generated Works under the Copyright, Designs and Patents Act 1988' [2021] *Intellectual Property Quarterly* 120.

11 Christian Handke *et al.* 'Copyright's Impact on Data Mining in Academic Research' (2021) 42 *Managerial Decision Economics* 1.

12 Michael Palmedo, 'The Impact of Copyright Exceptions for Researchers on Scholarly Output' (2019) 2 *Efil Journal of Economic Research* 114.

13 Sean Flynn and Michael Palmedo, 'The User Rights Database: Measuring the Impact of Copyright Balance' (2019) Digital Commons @ American University Washington College of Law Working Papers 42. Available at [https://digitalcommons.wcl.american.edu/fac\\_works\\_papers/42](https://digitalcommons.wcl.american.edu/fac_works_papers/42) (accessed March 1 2022).

14 Sheona Burrow, 'The Law of Data Scraping: A Review of UK Law on Text and Data Mining' (March 2021) CREATE Working Paper 2021/2. Available at <https://www.create.ac.uk/blog/2021/03/30/new-working-paper-the-law-of-data-scraping-a-review-of-uk-law-on-text-and-data-mining/> (accessed March 1 2022).

value from protected works; or (ii) introducing a technologically neutral, open-ended exception akin to the fair use doctrine in the USA.

We understand that option (i) could be effected by judicial interpretation, especially in a post-Brexit context allowing UK courts to depart from the jurisprudence of the Court of Justice of the European Union (CJEU). Lord Hoffmann's speech in *Designer's Guild*, for example, makes it clear that copyright protection should not extend to the ideas underlying LDMA works.<sup>15</sup> If 'a literary work which describes a system or invention does not entitle the author to claim protection for his system or invention as such,' the same equally applies to text and data mining which are more concerned with accessing the information disclosed in—rather than taking the expression of—protected works.<sup>16</sup>

Introducing an open-ended exception (ii), however, is a matter of legislation. In 2011, Professor Hargreaves was specifically asked to investigate the benefits of fair use and how it could be implemented in the UK.<sup>17</sup> At the time, the Hargreaves Review concluded that the introduction of fair use into UK law would likely be inconsistent with the EU copyright framework. Instead, the Review recommended the adoption of several closed exceptions stemming from the InfoSoc Directive, including text and data mining. Following Brexit, now may be the time for the UK to rethink fair use.

Innovation is determined by a wide variety of economic, cultural, political and social factors, and in the field of copyright, fair use has been a successful legal mechanism in promoting it. In the USA, fair use has allowed the emergence of indexing and search technology, the Google Books project, and, more recently, the copying of code from the Java API into the Android

operating system.<sup>18</sup> The recent jurisprudence of the US Supreme Court may suggest that most AI-related uses of copyright works are likely to fall within fair use. Would these types of innovation and other potential applications of AI be equally accommodated by rule-based, purpose-limited exceptions such as copying for text and data analysis? We do not think so.

The interests of rightholders are of course legitimate. However, the proposed Option 1 of developing a licensing environment that would provide lawful access to the underlying data within countless copyright works seems unrealistic. Requiring rights clearance for TDM and other AI uses of protected materials would increase transaction costs significantly, raising entry barriers for small and medium-sized enterprises (SMEs), in particular market entrants. Big tech corporations would likely retain access to enormous, high-quality, exponentially growing amounts of data, while others 'may find it economically attractive to train their algorithms on "cheaper", which often means older, less accurate or biased, data.'<sup>19</sup>

## 4. Patent inventorship

### Policy options offered by the UK IPO

| Patent inventorship |   |
|---------------------|---|
| 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                              |

### Assessment

Based on the evidence currently available (or the lack thereof), we argue that no reform is necessary in this area (**Option 0**).

Significantly, there is no compelling economic evidence or policy for AI to be formally recognized as 'inventor'. Unlike (real) human inventors, AI does not have a moral claim to inventorship, neither do we anticipate any disputes relating to entitlement to grant to arise from a

15 *Designers Guild Ltd v Russell Williams (Textiles) Ltd* [2000] 1 WLR 2416, HL, 2423 ('... a copyright work may express certain ideas which are not protected because they have no connection with the literary, dramatic, musical or artistic nature of the work. It is on this ground that, for example, a literary work which describes a system or invention does not entitle the author to claim protection for his system or invention as such. The same is true of an inventive concept expressed in an artistic work.'). See also *Newspaper Licensing Agency Ltd v Marks & Spencer Plc* [2001] UKHL 38, [19]–[27].

16 See also *Catnic Components Limited v Hill and Smith Limited* [1982] RPC 183, HL, 223, rejecting infringement of artistic copyright based on the taking of drawings of lintels used in construction ('If an 'artistic work' is designed to convey information, the importance of some part of it may fall to be judged by how far it contributes to conveying that information, but not, in my opinion, by how important the information may be which it conveys or helps to convey. What is protected is the skill and labour devoted to making the 'artistic work' itself, not the skill and labour devoted to developing some idea or invention communicated or depicted by the 'artistic work'. The protection afforded by copyright is not, in my judgment, any broader, as counsel submitted, where the 'artistic work' embodies a novel or inventive idea than it is where it represents a commonplace object or theme').

17 Hargreaves (n 8).

18 *Authors Guild v Google Inc* 770 F Supp 2d (SDNY 2011); *Authors Guild v Google Inc* 721 F3d (2nd Cir 2013); *Authors Guild v Google Inc* 954 F Supp 2d (SDNY 2013); *Authors Guild v Google Inc* 804 F3d (2nd Cir 2015); *Google LLC v Oracle America Inc* 141 S Ct 1163 (2021).

19 The narrow current UK exception may in fact incentivise the import of AI models already trained on unverifiable data. See Thomas Margoni and Martin Kretschmer, 'A Deeper Look into the EU Text and Data Mining Exceptions: Harmonisation, Data Ownership, and the Future of Technology' (July 2021) CREATE Working Paper 2021/7. Available at <https://www.create.ac.uk/blog/2021/07/14/ai-machine-learning-and-eu-copyright-law/> (accessed March 1 2022).

purported ‘AI inventor’. We share the view (and frustration) of other legal scholars<sup>20</sup> and practitioners<sup>21</sup> that the AI inventorship debate is seriously overblown and, indeed, seems to be detracting from other, more significant issues in the field. The existing patent framework is fully capable to accommodate technological developments in AI, just as it has been done with biotechnology.<sup>22</sup>

Furthermore, any reforms which the government may understand to be required should be implemented at the international level, which may not seem achievable or even realistic at this juncture. Formal recognition of this putative inventorship would have to be mirrored across most patent systems; otherwise, applications claiming UK priority may be found incompatible, raising significant barriers to and associated costs with international prosecution. The European Patent Office (EPO), for example, has recently confirmed on appeal the rejection of the DABUS applications EP 18 275 163 and EP 18 275 174. While the decision has yet to be made publicly available, the EPO made it clear that ‘only a human inventor could be an inventor’ and ‘a machine could not transfer any rights to the applicant.’<sup>23</sup> Unless harmonization is sought—and hopefully achieved—via international law, interventions at the national level will only risk inconsistency. Rather, the current UK position, following the Court of Appeal’s judgement in *Thaler v Comptroller General of Patents*,<sup>24</sup> is one of relative legal certainty—we do know that AI *cannot* be named as inventor and, empirically, nothing suggests there is a pressing need for this to be changed.

Hence, the reform proposals 1 and 2 under consideration would run counter to the tradition of UK patent law which has been largely developed by judicial practice striving for consistency with EPO decisions.<sup>25</sup> In a rapid

developing field such as AI, ex post regulation through minor doctrinal adjustments within the discretion of courts and patent offices should be the norm. In the past, more significant policy issues such as the patentability of second medical use inventions have been addressed this way under the European Patent Convention.<sup>26</sup> Legislative intervention of the kind being proposed is unwarranted, running the risk of increasing transaction costs associated with patent protection without any tangible benefit.

Particularly, there is no conclusive evidence that AI systems can effectively invent autonomously.<sup>27</sup> Indeed, the previous call for views on AI concluded that ‘there appeared to be near complete agreement that AI systems are not, or not yet, independent agents seeking patent rights without human intervention.’<sup>28</sup> In response to that consultation, IBM stated that ‘AI with the ability to invent without the assistance of a human is a considerable way off ... We believe that AI will remain tools that assist humans, rather than invent independently and autonomously, for a considerable time.’<sup>29</sup> It is therefore not surprising that some have questioned the ability and legitimacy of the so-called DABUS system, which is not sufficiently explained in any of the patent applications referencing it. Put this way, one might speculate whether the *Thaler* litigation amounts to anything other than a publicity stunt.<sup>30</sup>

The introduction of a new, *sui generis* right to protect AI-devised inventions referred to as Option 2 would also be ill-advised. This would significantly increase

courts (the Boards of Appeal and Enlarged Board of Appeal of the EPO) involved daily in the administration of the EPC and secondly, because it would be highly undesirable for the provisions of the EPC to be construed differently in the EPO from the way they are interpreted in the national courts of a Contracting State’.

20 Dan L Burk, ‘AI Patents and the Self-Assembling Machine’ in Daniel J Gervais (ed) *The Future of Intellectual Property* (Edward Elgar 2021).

21 Rose Hughes, ‘DABUS: An AI inventor or the Emperor’s New Clothes?’ (*IPKat Blog*, 15 September 2021). <https://ipkitten.blogspot.com/2021/09/dabus-ai-inventor-or-emperors-new.html> accessed 23 December 2021.

22 See, in particular, Burk (n 21) 130 (‘... far from challenging the existing order of patent law, the patent system is fully equipped to encompass AI innovation, with perhaps some minor doctrinal accommodations that are well within the policy lever discretion available to the courts and to the patent offices.’). While the EU enacted the Biotechnology Directive, the jurisprudence and practice of the European Patent Office largely draws on the general provisions of the European Patent Convention.

23 European Patent Office, *Press Communiqué on Decisions J 8/20 and J 9/20 of the Legal Board of Appeal* (21 December 2021) <https://www.epo.org/law-practice/case-law-appeals/communications/2021/20211221.html> accessed 23 December 2021.

24 *Thaler v Comptroller General of Patents, Trade Marks and Designs* [2021] EWCA Civ 1374.

25 See also *Merrell Dow Pharmaceuticals Inc v Norton & Co Ltd* [1995] UKHL 14, [12] (‘[UK courts] must have regard to the decisions of the European Patent Office (“EPO”) on the construction of the EPC. These decisions are not strictly binding upon courts in the U.K. but they are of great persuasive authority; first, because they are decisions of expert

26 See, in particular, *Eisai/Second Medical Indication G05/83* [1979–85] EPOR B241 (Enlarged Board of Appeal); *John Wyeth & Brother Ltd’s Application* [1985] RPC 545. For an account of the judicial development of Swiss-form claims, see also *Actavis UK Ltd v Merck & Co Inc* [2008] EWCA Civ 444, [7]–[48].

27 Daria Kim *et al.* ‘Artificial Intelligence Systems as Inventors? A Position Statement of 7 September 2021 in View of the Evolving Case Law Worldwide’ (September 2021) Max Planck Institute for Innovation and Competition, 5. Available at [https://www.ip.mpg.de/fileadmin/ipmpg/content/stellungnahmen/MPI\\_Position\\_statement\\_AI\\_Inventor\\_2021-08-09.pdf](https://www.ip.mpg.de/fileadmin/ipmpg/content/stellungnahmen/MPI_Position_statement_AI_Inventor_2021-08-09.pdf) (accessed March 1 2022). See also Burk (n 21) 131 (‘Such systems are not intelligent in any robust sense of the word; they lack any hint or expectation of encompassing “strong” AI with general cognitive abilities of the sort that humans (or even animals) routinely display. There is at present no serious prospect of designing machines with such capabilities ...’).

28 *Government Response to Call for Views on Artificial Intelligence and Intellectual Property* (23 Mar 2021).

29 *IBM response* (20 November 2020) [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/971519/Response-to-AI-5.zip](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/971519/Response-to-AI-5.zip) accessed 29 December 2021.

30 See also Rose Hughes, ‘The First AI Inventor—IPKat Searches for the Facts Behind the Hype’ (*IPKat Blog*, 15 August 2019) <https://ipkitten.blogspot.com/2019/08/the-first-ai-inventor-ipkat-searches.html> accessed 29 December 2021.

costs associated with determining the content of this law, including matters of prosecution and enforcement, which may have a differential impact on small and medium-sized enterprises (SMEs) in the field of technology. There is no guarantee that this new form of protection would develop in the same way as or even build on the existing patent jurisprudence, for example. Recent experience with database rights and supplementary protection certificates both illustrate the difficulty in determining, let alone predicting, how the relevant statutory provisions will be interpreted and applied.

By and large, patent applications for AI-related inventions—particularly those featuring deep learning and neural networks—are expected to increase over the next years.<sup>31</sup> Even if AI reaches the stage of developing inventions with minimal or no human intervention and those outputs prove to be unpatentable on such grounds, there is no economic evidence indicating this would be detrimental to the investment in and the development of AI technology. As a practitioner has suggested, ‘the main commercial players in the AI field, such as Google DeepMind, continue to navigate the patent system without apparent concern about the issue of AI inventorship.’<sup>32</sup>

31 World Intellectual Property Organization, *WIPO Technology Trends 2019: Artificial Intelligence* (2019).

32 Hughes (n 22).