

AI as an Inventor

Has the Federal Court of Australia Erred in DABUS?

by Rita Matulionyte*

Abstract: The emergence of advanced Artificial Intelligence (AI) technologies has caused an international debate as to whether inventions generated by AI technology without human intervention should be protected under patent law and who should own them. These questions have been discussed in a recent Federal Court of Australia decision in *Thaler v Commissioner of Patents*. In that judgment, Beach J recognised that some AI has the ability to autonomously invent and that such AI-generated inventions could be protected under patent law. His Honour held that, in such instances, an AI system could and should be listed as an inventor in a patent application. This article challenges the decision by arguing that, even in the case of the most sophisticated

AI systems, these systems are not autonomous in the inventive process as humans provide significant contributions to the very system that leads to the inventive output. Secondly, I contend that the discussion on the need of patent protection for AI-generated inventions (if it were possible at all) is misplaced and not sufficiently comprehensive. Finally, the expanded application of the Patents Act 1990 (Cth), and especially s 15(1), to accommodate 'AI inventors', is an over-reach that is not consistent with the current law. The article recommends that the AI inventorship question should be decided not by courts, but by a policy making body and all interested stakeholders should be engaged in the discussion on this important matter.

Keywords: Artificial Intelligence; DABUS; Inventor

© 2022 Rita Matulionyte

Everybody may disseminate this article by electronic means and make it available for download under the terms and conditions of the Digital Peer Publishing Licence (DPPL). A copy of the license text may be obtained at <http://nbn-resolving.de/urn:nbn:de:0009-dppl-v3-en8>.

Recommended citation: Rita Matulionyte, AI as an Inventor: Has the Federal Court of Australia Erred in DABUS?, 13 (2022) JIPITEC 99 para 1

A. Introduction

1 Recent years have seen an increasing international discussion on the intersection of Artificial Intelligence (AI) technologies and Intellectual Property (IP) laws,¹ including the challenges that AI technol-

ogies lead to in the area of patent law. One of the most widely discussed questions has been the ability of AI to generate inventions without human contribution (AI-generated inventions) and the need to revise patent laws to accommodate these developments.² This question has recently been covered in

* Dr., LL.M., senior lecturer at Macquarie Law School, Macquarie University; rita.matulionyte@mq.edu.au.

1 See eg Courtney White, Rita Matulionyte, 'Artificial Intelligence Painting a Larger Picture on Copyright,' (2020) 30 *Australian Intellectual Property Review* 224; Russ Pearlman, 'Recognizing Artificial Intelligence (AI) As Authors and Inventors Under U.S. Intellectual Property Law' (2018) 24(2) *Richmond Journal of Law and Technology* 1; Ana Ramalho, 'Will Robots Rule The (Artistic) World? A Proposed Model

For The Legal Status Of Creations By Artificial Intelligence Systems' (July 2017) 21(1) *Journal of Internet Law* 12; Tim W Dornis 'Artificial Creativity: Emergent Works and the Void in Current Copyright Doctrine' (2020) 22 *Yale J L & Tech* 1.

2 See W. Michael Schuster, 'Artificial Intelligence and Patent Ownership', (2018) 75 *Wash. & Lee L. Rev.* 1945, Erica Fraser, 'Computers as Inventors - Legal and Policy Implications of Artificial Intelligence on Patent Law' (2016) 13 *SCRIPTed* 305, p 328; Ryan Abbott, 'I Think, Therefore I Invent: Creative Computers and the Future of Patent Law', (2016) 57 *B.C.L.*

several national and international public consultations, including the US Patent and Trade Mark Office (USPTO) consultation on AI and IP,³ the World Intellectual Property Organization (WIPO) dialogue on AI and IP,⁴ the UK consultation on AI and IP,⁵ as well as several comprehensive academic reports.⁶

- 2 A recent legal development in the area of AI and patent law is the Artificial Inventor Project, the goal of which is to establish that an AI system can be listed as an inventor in patent applications.⁷ In 2018, a team of patent attorneys acting on behalf of an AI scientist, Dr Stephen Thaler, submitted two patent applications listing an AI system, DABUS, as an inventor.⁸ DABUS, an acronym for ‘device for the autonomous bootstrapping of unified sentience’, is an innovative

AI system created by Dr. Thaler.⁹ It is stated that DABUS invented the flashing light and the food container based on fractal geometry that were listed in the disputed patent applications. The two patent applications were initially filed in 2018 in the UK Intellectual Property Office (UKIPO). By operation of the Patent Cooperation Treaty (PCT), the applications were extended to a number of countries, including the US, Germany, Europe, Australia, South Korea, Japan, Israel, Canada, New Zealand, Taiwan and others.¹⁰

- 3 To date, the applications have been rejected by the UKIPO,¹¹ European Patent office (EPO),¹² German Patent and Trademark Office,¹³ US Patent and Trademark Office (USPTO),¹⁴ and Australian Intellectual Property Office (AUIPO).¹⁵ The South African patent office was satisfied that AI could be listed as an inventor in the patent application and has granted the patent,¹⁶ with that decision drawing criticism from a number of commentators.¹⁷

- 4 The applicant appealed unfavorable decisions from the relevant patent offices, with the UK being the

Rev. 1079; L Vertinsky and T Rice, “Thinking About Thinking Machines: Implications Of Machine Inventors For Patent Law” (2002) 8 *Boston University Journal of Science & Technology Law* 574-613, p. 586.

3 US Patent and Trade Mark Office ‘Public Views on Artificial Intelligence and Intellectual Property Policy’ (October 2020), https://www.uspto.gov/sites/default/files/documents/USPTO_AI-Report_2020-10-07.pdf.

4 Issues that are addressed during this dialogue are summarized in WIPO Revised Issues Paper on Intellectual Property Policy and Artificial Intelligence (May 29, 2020), https://www.wipo.int/meetings/en/doc_details.jsp?doc_id=499504 (WIPO Revised Issues Paper).

5 UK Intellectual Property Office ‘Government response to call for views on artificial intelligence and intellectual property’ (as updated on 23 March 2021), <https://www.gov.uk/government/consultations/artificial-intelligence-and-intellectual-property-call-for-views/government-response-to-call-for-views-on-artificial-intelligence-and-intellectual-property> (UKIPO Report).

6 See eg Joint Institute for Innovation Policy and IViR-Amsterdam University, ‘Trends and Developments in Artificial Intelligence: Challenges to the Intellectual Property Rights Framework’, report for the European Commission (2020), https://www.ivir.nl/publicaties/download/Trends_and_Developments_in_Artificial_Intelligence-1.pdf (JIIP/IVIR Report); Drexler J. et al, Artificial Intelligence and Intellectual Property Law: Position Statement of the Max Planck Institute for Innovation and Competition of 9 April 2021 on the Current Debate, https://www.ip.mpg.de/fileadmin/ipmpg/content/stellungnahmen/MPI_PositionPaper__SSRN_21-10.pdf (MPI Report).

7 See Artificial Inventor Project website <https://artificialinventor.com/>

8 GB1816909.4 and GB1818161.0

9 For more information about the DABUS system see Artificial Inventor Project website <https://artificialinventor.com/>

10 The up-to-date list of applications and their outcomes is available at <https://artificialinventor.com/patent-applications/>.

11 UK Intellectual Property Office decision of 04 December 19 – BL 0/741/19.

12 EPO decision of 27 Jan 2020 on EP 18 275 163 and EPO decision of 27 Jan 2020 on EP 18 275 174.

13 Application Numbers: DE 10 2019 128 120.2 & DE 10 2019 129 136.4. Decisions have not been published; information about pending decisions is available at <https://artificialinventor.com/patent-applications/>.

14 USPTO decision 22 April 2020 re 16/524,350.

15 AUIPO Decision of 9 February 2021 - *Stephen L. Thaler* [2021] APO 5.

16 The patent was published in Patent Journal (July 2021) p 255, available at https://iponline.cipc.co.za/Publications/PublishedJournals/E_Journal_July%202021%20Part%202.pdf

17 See, e.g. Jeremy Smith, ‘South Africa issues world’s first patent naming AI as inventor, July 29, 2021, <https://www.mathys-squire.com/insights-and-events/news/south-africa-issues-worlds-first-patent-naming-ai-as-inventor/>; Joff Wild, ‘South Africa awards world’s first AI-invented patent, but it may not be that big a deal’ July 28, 2021, <https://www.iam-media.com/law-policy/south-africa-ai-patent-award>.

first country where a judicial decision on the matter was handed down. On 21 September 2020, Justice Marcus Smith in the High Court of England and Wales (UK) dismissed Dr Thaler's appeal and upheld the UKIPO decision, confirming that an AI cannot be listed as an inventor because it is a person.¹⁸ More recently, the UK Court of Appeal by majority (Arnold LJ and Laing LJ; Birss LJ dissenting) upheld the judgment at first instance.¹⁹ While all three judges agreed that AI cannot be listed as an inventor, their opinions diverged on whether the Patent Office has sufficient grounds to consider the application as withdrawn. Similarly, in September 2021, Judge Leonie Brinkema in the United States District Court for the Eastern District of Virginia dismissed an appeal by Dr Thaler and upheld the decision of the USPTO, that an AI machine cannot be an inventor under US patent law.²⁰ Brinkema J referred to the statutory language in the Patent Act (35 U.S. Code) and the recent *America Invents Act 2011* (such as "individual" and "himself or herself") to hold that an inventor must be a human being.²¹ Earlier this year, a similar decision was made by the Intellectual Property and Commercial Court (Taiwan), which ruled that only humans could be inventors.²²

- 5 In this context and with this background, the Federal Court of Australia (FCA) decision in *Thaler v Patent Commissioner*²³ is an international outlier. On 30 July 2021, Justice Beach overturned the primary decision of IP Australia and concluded that AI could be listed as an inventor under the *Patents Act*. It is the first – and so far, the only – court decision internationally suggesting that AI can be an inventor under current patent law.
- 6 This paper, after briefly introducing the facts of the case and the arguments advanced by both the Commissioner of Patents and Dr Thaler, respectfully criticizes the Federal Court decision on three main grounds. First, this paper will challenge his Honour Beach J's finding that AI is capable of inventing without human intervention. It will demonstrate that,

18 *Thaler v The Comptroller-General of Patents, Designs And Trade Marks* [2020] EWHC 2412 (Pat).

19 *Thaler v The Comptroller-General of Patents, Designs And Trade Marks* [2021] EWHC Civ 1374.

20 *Thaler v. Iancu*, case no. 1:20-cv-00903 (E.D. Va).

21 *Ibid.*

22 *Thaler v. Intellectual Property Office, Intellectual Property and Commercial Court*, 101 Xin Zhuan Su No. 3 Administrative Decision (智慧財產及商業法院110年度行專訴字第3號行政判決), 19 August, 2021.

23 *Thaler v Commissioner of Patents* [2021] FCA 879.

even in the case of the most advanced AI technologies, such as Artificial Neural Networks (ANN),²⁴ humans are providing significant contributions to the inventive process at various steps, while machines are simply performing the tasks that are assigned to them, even if in a highly complex and automated way. Secondly, the Court's reasoning in favor of patent law protection for AI-generated inventions (if such autonomous inventions are possible at all), is both misplaced and not sufficiently in-depth or comprehensive. As per Arnold LJ in the UK Court of Appeal, "[courts] must apply the law as it presently stands: this is not an occasion for debating what the law ought to be."²⁵ Finally, it will be demonstrated that the Australian court failed to adequately reason that the *Patents Act*, and especially section 15, does not create an obstacle in allowing for an AI to be listed as an inventor. It will ultimately be submitted that the interpretation of section 15 was too broad, failed to give sufficient weight to the explicit language of the statute, and was not based on existing legal doctrines.

B. Facts and findings

I. IP Australia decision

- 7 The PCT patent application listing DABUS as an inventor entered the national phase in Australia on 9 September 2020. After a formalities check, IP Australia issued a direction stating that an inventor must be a natural person and asked the applicant to amend the inventor or provide further comments.²⁶ In the written submissions, the applicant contended that DABUS can and should be listed as the inventor because the sole contributor to the invention was DABUS itself. Further, the *Patents Act* does not contain a definition of the term 'inventor', and Dr Thaler derived title to the invention under common law principles of accession or first possession.²⁷ These submissions were rejected by IP Australia.

- 8 In a decision handed down on 9 February 2021, IP Australia held that the applicant did not comply with

24 For a brief explanation of ANN technologies see 'Neural Networks' <https://www.ibm.com/cloud/learn/neural-networks>

25 *Thaler v The Comptroller-General of Patents, Designs And Trade Marks* [2021] EWHC Civ 1374, 114.

26 Application no 2019363177, Formalities Report, 21 September 2020.

27 Application no 2019363177, Formalities Response, 19 November 2020, Formalities response 09 December 2020.

the direction under regulation 3.2C(4) to name an inventor who is a natural person and, accordingly, the application was held to have lapsed. The Deputy Commissioner, Dr S.D Barker, concluded that an AI machine cannot be an inventor for the purposes of regulation 3.2C(2)(aa) as this would be inconsistent with the *Patents Act*.²⁸ The Deputy Commissioner looked at the ordinary meaning of the word ‘inventor’ and concluded that “I have no evidence whether the ordinary meaning of “inventor”, assessed at the present day, can include a machine”.²⁹ The Deputy Commissioner went on to find that the interpretation of ‘inventor’ as encompassing a non-human would be inconsistent with other provisions of the Act. In particular, such interpretation would be incompatible with section 15(1), which outlines the persons who are capable of being granted a patent.³⁰

9 Pursuant to section 15(1) of the Act, an invention may only be granted to a person who:

- (a) is the inventor; or
- (b) would, on grant of a patent for the invention, be entitled to have the patent assigned to the person; or
- (c) derives title to the invention from the inventor or a person mentioned in paragraph (b); or
- (d) is the legal representative of a deceased person mentioned in paragraph (a),
- (b) or (c).

10 The Deputy Commissioner concluded that, since only a person can be a patentee, section 15(1)(a) could not apply in a scenario where AI is an inventor, because “absent devolution, the inventor will have to become the patentee”.³¹ It was held that section 15(1)(b) is not consistent with treating an AI machine as an inventor because the law does not presently recognise the capacity of an AI machine to ‘assign’ property.³² Looking at s 15(1)(c), the Deputy Commissioner identified two ways in which a person can derive title from the inventor – via assignment or via communication – and found that none of them are possible in a given scenario.³³ Finally, it was held that the common law rules of accession or first possession, as relied upon by the applicant, do not apply because they require “conceptually moving title “from” the artificial intelligence machine to the owner of the

machine.”³⁴ According to the Deputy Commissioner, since an AI machine is not capable of holding legal title in the first place, such ‘conceptual move’ of title is not possible.

II. Federal Court of Australia decision

11 On 30 July 2021, the Federal Court of Australia handed down its decision, upholding the appeal. Beach J, in a decision of some 228 paragraphs, set aside the Deputy Commissioner’s determinations and remitted the matter for reconsideration.³⁵

12 By way of introduction, Beach J discusses, *inter alia*, the functioning of artificial neural networks (ANN), the technology that underlies the DABUS system, its similarity in function to a human brain, and its capability to make autonomous decisions.³⁶ His Honour further discusses, at length, the increasing importance of innovative AI technologies, especially in the pharmaceutical industry.³⁷

13 The analytical section of the decision is structured into four sections. In the first section (‘General observations’) Beach J observes that none of the provisions in the *Patent Act* expressly refute the proposition that an AI system can be an inventor. His Honour then states that the word ‘inventor’ is an agent noun, similar to other agent nouns such as “computer”, “lawnmower” and “dishwasher”, where an agent can be a person or a thing.³⁸ Beach J suggests that the concept of ‘inventor’ should be seen in a flexible and evolutionary way, similar to the concept of ‘manner of manufacture’, the widening of which “is a necessary feature of the development of patent law in the twentieth and twenty-first centuries as scientific discoveries inspire new technologies”.³⁹

14 It was held that a broad construction of the term ‘inventor’ would be consistent with the objects of the *Patents Act* to promote “economic wellbeing through technological innovation and the transfer and dissemination of technology”⁴⁰. His Honour stated

28 *Stephen L. Thaler* [2021] APO 5, [1].

29 *Ibid* [6], [7], [12].

30 *Ibid* [26-33].

31 *Ibid* [20].

32 *Ibid* [26].

33 *Ibid* [27-28].

34 *Ibid* [30].

35 *Thaler v Commissioner of Patents* [2021] FCA 879 [10].

36 *Ibid* [19-43].

37 *Ibid* [44-56].

38 *Ibid* [120].

39 *Ibid* [121].

40 S 2A Patent Act 1990, *Thaler v Commissioner of Patents* [2021] FCA 879 [124].

that “computer inventorship would incentivise the development by computer scientists of creative machines, and also the development by others of the facilitation and use of the output of such machines, leading to new scientific advantages”.⁴¹ Arguably, computers have been autonomously or semi-autonomously generating inventions for some time, and “[n]ot recognising the reality could produce inefficiency if not logical difficulties, which would be the antithesis of the s 2A object.”⁴²

- 15 In the second section (‘Dictionary definitions’) Beach J found the Deputy Commissioner’s reliance on dictionary definitions as problematic⁴³ and concluded that “dictionaries are not a substitute for statutory interpretation, and the application of a dictionary definition in place of the words in the statute can lead to error by introducing requirements not contained in the statutory text”.⁴⁴ His Honour explained that definitions of words are changing historically over time.⁴⁵ Arguably, this suggests that dictionary definitions of ‘inventor’ do not necessarily express the current or emerging meanings of the word.
- 16 The third section of his Honour’s analysis focuses on section 15 of the *Patents Act*, which loomed large in the decision of the Deputy Commissioner. His Honour agreed that patents can only be granted to persons, that only persons can apply for a patent, and that AI systems cannot own or legally assign an invention.⁴⁶ However, in his Honour’s view, this does not lead to a conclusion that section 15 precludes an AI system being listed as an inventor.⁴⁷ First, his Honour states that “it is a fallacy to argue from s 15(1)(a) that a non-human, indeed a non-person, cannot be an inventor. It could be, but it could not be granted a patent.”⁴⁸ Second, with relation to s 15(1)(b), that refers to a person ‘entitled to have the patent assigned’ to them, Beach J states that an entitlement and any assignment could arise not only

by agreement but also by conduct, informally, or by operation of law.⁴⁹ Beach J accepted the accession, or first possession, principles advanced by the applicant. According to the common law principle of accession (or first possession), the owner of the existing tangible property (eg an apple tree) would become an owner of the outputs generated by that property (eg apples).⁵⁰ Applying this principle, Beach J held that Dr Thaler would be the owner of the patent because he is the owner, programmer, and operator of DABUS.⁵¹ Similarly, when applying s 15(1)(c) of the Act, the court held that “the concept of derivation is broad and is not limited to assignments or any transfer of title as such”⁵² and that “Dr Thaler prima facie falls within s 15(1)(c) because he has derived title to the invention from the inventor, DABUS” as a result of his ownership and possession of the invention.⁵³

- 17 In the final section of the analysis (‘Miscellaneous statutory provisions and other matters’) his Honour agreed that s 172(1), 182(3) and 185(a) predicate that the inventor, in the context in which they dealt with, is a person. However, “the fact that the Act stipulates rights or consequences for an inventor who is a person in some places does not logically entail that an inventor must be and can only be a person for all purposes.”⁵⁴

C. Comment and critique

- 18 The decision in *Thaler v Commissioner of Patents* provides an interesting and unique contribution to the discussion on AI-generated inventors and patent law. It is unique from a number of perspectives. It is the first decision to date that describes AI technology in detail and holds that AI is capable of autonomous invention and patent protection for AI-generated inventions. It is also unique in that it is the first, and so far, the only court decision that provides a broad interpretation of the ‘inventor’ concept under Australian patent law, which would include AI machines as possible inventors.

41 *Thaler v Commissioner of Patents* [2021] FCA 879 [125].

42 *Ibid* [127-129], 129, citing Ryan Abbott, ‘I Think, Therefore I Invent: Creative Computers and the Future of Patent Law’ (2016) 57(4) *Boston College Law Review* 1079, 1103 to 1104.

43 *Ibid* [147].

44 *Ibid* [153].

45 *Ibid* [152] (‘dictionaries are by their nature developed from historical usage’).

46 *Ibid* [158].

47 *Ibid* [158], [165].

48 *Ibid* [160].

49 *Ibid* [161].

50 For a more detailed discussion of this doctrine see *Thaler v The Comptroller-General of Patents, Designs And Trade Marks* [2021] EWHC Civ 1374, at 30.

51 *Ibid* [167].

52 *Ibid* [162].

53 *Ibid* [177].

54 *Ibid* [212].

19 However, it is respectfully submitted that the judge’s decision is certainly open to challenge. This paper will challenge the three contentions made by the court: first, that AI is capable of autonomous invention; second, that AI-generated inventions should be patentable; and third, that an expansive interpretation of ‘inventor’ is compatible with section 15 of the *Patents Act 1990*.

I. AI is capable of autonomous invention

20 The first argument challenges the proposition by Beach J. that AI is capable of autonomous invention. According to Beach J, “machines have been autonomously or semi-autonomously generating patentable results for some time now”.⁵⁵ This statement suggests that there is generally no doubt about the ability of AI to invent, and that such inventions are not entirely new and have been generated for a while. Whilst that is an important factual question, it is noted that it was not a question that was determined by IP offices or courts overseas that have decided the case on similar facts.⁵⁶

21 The arguments that the court uses to prove AI’s ability to invent autonomously, however, are open to question. First, his Honour suggests that artificial neural networks (ANN), a type of a machine learning algorithm that was used in developing the DABUS system, are very similar in their workings to natural neural networks found in a human brain.⁵⁷ As a human brain is capable of independently inventing, this comparison seems to imply that ANN should similarly be able to invent. Secondly, the court argues that the ANN technology underlying DABUS is essentially autonomous, i.e. it is a ‘self-assembling’, ‘self-organizing’ system that is capable of generating novel patterns and adapting to new scenarios without additional human input.⁵⁸

55 Ibid [126].

56 UK Intellectual Property Office decision of 04 December 19 – BL 0/741/19 [15] (“Office practice is to accept that the indication of inventors at face value, and that it is up to others to challenge the veracity of such an indication”), see similar approach in USPTO decision 22 April 2020 re 16/524,350, p 6.

57 *Thaler v Commissioner of Patents* [2021] FCA 879 [19-29] (e.g. ANN “self-organise to simulate the way in which the human brain processes and generates information” and “has the ability of the network to learn from experience”).

58 *Thaler v Commissioner of Patents* [2021] FCA 879 [41] (“DABUS could be described as self-organising as a cumulative result of algorithms collaboratively generating complexity. DABUS generates novel patterns of information rather than

Finally, the court “pose[s] some questions and make[s] some assumptions:”⁵⁹

*“Who sets the goal for the system? The human programmer or operator? Or does the system set and define its own goal? Let the latter be assumed. Further, even if the human programmer or operator sets the goal, does the system have free choice in choosing between various options and pathways in order to achieve the goal? Let that freedom also be assumed. Further, who provides or selects the input data? Let it be assumed that the system can trawl for and select its own data.(...)”*⁶⁰

22 His Honour concludes: “Making all of these assumptions, can it seriously be said that the system is just a brute force computational tool? Can it seriously be said that the system just manifests automation rather than autonomy? (...) [I]t would seem to me that such a system could at least be described as semi-autonomous if not autonomous.”⁶¹

23 The analysis below demonstrates that the reasoning adopted by the court does not convincingly establish that AI generally, or ANN more specifically, is capable of autonomous invention. The arguments are flawed from at least three perspectives.

1. Anthropomorphic rhetoric is inappropriate

24 First, by repeatedly drawing a parallel between the human brain and ANN technology⁶² the court is engaging into anthropomorphic rhetoric. Experts warn that while the analogy between ANN and the human brain might be ‘helpful when explaining complex models to audiences with minimal background in statistics and computer science’⁶³, it might also be

simply associating patterns. Further, it is capable of adapting to new scenarios without additional human input. Further, the artificial intelligence’s software is self-assembling. So, it is not just a human generated software program that then generates a spectrum of possible solutions to a problem combined with a filtering algorithm to optimise the outcome.”

59 Ibid [126].

60 Ibid [127].

61 Ibid [128].

62 See e.g., such terms as ‘memories’, ‘learn from experience’ used by Beach J throughout the introductory section.

63 David Watson, ‘The Rhetoric and Reality of Anthropomorphism in Artificial Intelligence’ 29 *Minds & Machines* 417-440, 434 (2019).

‘misleading and potentially dangerous’.⁶⁴ Here, this analogy is employed to indirectly suggest that ANN is capable of autonomously generating new ideas in the same way as human brain, and therefore should be eligible for an inventor status. However, as discussed below, it is very doubtful that ANN, or AI technologies in general, enjoy the same or even a similar amount of autonomy as a human brain does. Thus, the analogy between a human brain and ANN technology is not helpful; rather, it provides a distorted picture of ANN technologies by implying ‘autonomous’ thinking, learning, and idea-generating features which they do not actually possess. Furthermore, the description of ANN technologies does not mention a human role in designing the technology and human influence on the idea generation, the point that will be developed in subsequent sections.

2. There is no sufficient evidence that ANN or DABUS are ‘autonomous’

25 Second, the argument that ANN in general and DABUS specifically are autonomous system that are capable of ‘self-assembling’, ‘self-organizing’ and developing new ideas ‘without human input’ is also open to challenge.

26 As far as ANN in general is concerned, experts suggest that humans play an essential role in designing AI systems, such as ANN, and in this way significantly contribute to the inventions or other outputs generated by such systems.⁶⁵ Human involvement in designing the AI system could be structured as follows: problem formulation; abstraction and modelling; the design of an algorithm; programming; data manipulation; execution; and interpretation and communication of results.⁶⁶ In each of these steps, humans have an indispensable role. Before any AI system is developed, humans set the computational problem that the system is going to address. Humans then reduce that problem “to a set of essential characteristics for a particular modelling purpose”⁶⁷. As a next

step, they develop “an effective procedure to solve a given problem, that is, a finite sequence of elementary and totally explicit (well defined and not ambiguous) instructions”,⁶⁸ that are known as an ‘algorithm’. Further, humans develop the data set that is then used and manipulated to train the algorithm. After the algorithm is trained, humans set a task to produce outputs that the AI module executes using the module developed by human. Finally, humans choose which outputs to select and communicate. Thus, according to commentators, notwithstanding the complexity of the algorithm, ‘the computers simply contribute to problem solving by ‘crunching numbers’ obediently, and it is by ‘brute force computation’ that they can outperform humans” (footnotes omitted).⁶⁹

27 For example, in the *Tencent* case⁷⁰ which was decided by a Chinese court, the defendant argued that the algorithm, Dreamwriter, autonomously produced the disputed media article and, therefore, the plaintiff did not own it. However, the Chinese court accepted the plaintiff’s argument that human originality could be found in various phases of Dreamwriter’s creation of the article. The court explained that, although it only took Dreamwriter two minutes to produce the disputed article (which was the result of the software’s operation of established rules, algorithms, and templates without any human participation), the automatic operation of Dreamwriter did not occur without a reason.⁷¹ It was noted that the software was not self-aware.⁷² Instead, Dreamwriter’s autonomous operation reflected its developers’

ing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/682579/computational-modelling-blackett-review.pdf> accessed 3 March 2020; see also Kim (n 62) 449.

68 Massimo Marraffa and Alfredo Paternoster, ‘Models and Mechanisms in Cognitive Science’ in Lorenzo Magnani and Tommaso Bertolotti (eds), *Springer Handbook of Model-Based Science* (Springer 2017) 929, 930.

69 Kim (n 62) 450-451; See also Tom Taulli, *Artificial Intelligence Basics: A Non-Technical Introduction* (Apress 2019) 66. (“Even ANN algorithms, that are not explicitly programmed in a conventional sense, do not run without precise instructions. They leverage mathematical and statistical methods to solve the problem, namely, their computational operations are guided by formulas, equations, functions, etc. that constitute a part of an algorithm.”).

70 *Tencent v. Shanghai Yingxun Technology Co. Ltd*, People’s Court of Nanshan (District of Shenzhen) (深圳市南山区人民法院 (2019)粤0305民初14010号民事判决), 24 Dec 2019.

71 Ibid.

72 Ibid.

64 Ibid; see also Daria Kim, ‘AI-Generated Inventions’: Time to Get the Record Straight?, (2020) 69(5) *GRUR International* 443, 444.

65 Kim (n 62) 449; Max Planck Institute for Innovation and Competition, ‘Artificial Intelligence Systems as Inventors? A Position Statement of 7 September 2021 in view of the evolving case-law worldwide’, available at https://www.ip.mpg.de/fileadmin/ipmpg/content/stellungnahmen/MPI_Position_statement_AI_Inventor_2021-08-09.pdf

66 Kim (n 62) 449.

67 Government Office for Science, ‘Computational Modelling: Technological Futures’ (2018) 112 <<https://assets.publish->

personalised selection and arrangement of data type, data format, the conditions that triggered the writing of the article, the templates of article structure, the setting of the corpus, and the training of the intelligent verification algorithm model.⁷³

- 28 With relation to DABUS, it is currently not clear to which extent humans have been involved in the development of DABUS and to which extent they contributed to the outputs generated by this AI system. Interestingly, the description of both ANN and the functioning of DABUS found in the Judgment (intentionally or otherwise) entirely ignores the human contribution to the AI development and functioning processes. Throughout the descriptive introduction consisting of 24 paragraphs⁷⁴, the court made no mention of the AI developer or Dr Thaler who developed the DABUS technology. However, it is inappropriate to ignore the developer's role in designing DABUS and their contribution to the final outputs. Presuming that Dr Thaler is the only person involved in the development of DABUS, it is reasonably assumed that Dr Thaler was the person who formulated the problem to be solved by the system, abstracted it for modeling purposes, developed a complex algorithm consisting of multiple layers of neural networks, introduced many new features in the algorithm,⁷⁵ created the training dataset, and used it to train the algorithm as a part of supervised learning.⁷⁶ Before DABUS arrived at the two inventions claimed in the patent applications, it is likely that Dr Thaler had provided certain instructions that were then carried out by the algorithm.⁷⁷ Finally, it is uncertain what role Dr Thaler played in the interpretation and communication of any outputs produced by DABUS. While the applicant argues that DABUS was the first to identify the novel idea,⁷⁸ commentators have criticized this contention suggesting that

humans are required for the interpretation and communication of results.⁷⁹

- 29 Overall, there is a paucity of evidence as to what role humans played in the development of DABUS and in generating its outputs. If the court had identified human contribution at different stages of the AI development and output generation, its conclusion on the autonomous nature of DABUS might have been different.

3. Assumptions are insufficient to prove autonomous nature of AI

- 30 Finally, the assertion by the judge that “machines have been autonomously or semi-autonomously generating patentable results for some time now” may not withstand scrutiny. The ‘questions and assumptions’ argument employed by the court, as cited above,⁸⁰ arguably, are neither logical nor convincing. The assumptions that the court makes about the capabilities of AI systems in general – that the AI system sets a goal for itself, that the system has a freedom to choose between various options and pathways in order to achieve the goal, that the system can trawl for and select its own data – do not receive support from the technical literature. The technical literature suggests that humans not only set the goals to the system but also design features and parameters on how the system should reach the set goals.⁸¹ According to commentators, even with relation to sophisticated techniques such as ANN, human decision making plays an essential role in applying them to a problem at hand.⁸² Thus, while the system might be programmed to search for and select its own data, it would do it only in accordance with clearly set parameters. Similarly, while the system might randomly choose between different pathways to achieve the goal, those options and pathways

73 Ibid.

74 See *Thaler v Commissioner of Patents* [2021] FCA 879 [19-43].

75 Ibid [42] and [36] (refer to algorithmic innovations introduced by the AI developer; see, respectively, “DABUS, and its underlying neural paradigm, represents a paradigm shift in machine learning” and “including ‘random disturbances’ that promote the formation of alternative chaining topologies”).

76 Ibid [37].

77 Instead of explaining different contributions by Dr Thaler, the court simply concludes ‘Finally, an output of the process described above is the alleged invention the subject of Dr Thaler’s application’, see *Thaler v Commissioner of Patents* [2021] FCA 879 [43].

78 *Stephen L. Thaler* [2021] APO 5 [1].

79 Kim (n 62) 455.

80 See discussion above at III.A.

81 See Fraser (n 2) p 315 (‘With the present state of AI technology, however, human ingenuity is still necessary to define targets, parameters and success criteria’), 323; see also R Plotkin, *The Genie in the Machine: How Computer-Automated Inventing is Revolutionizing Law & Business* (Stanford: SUP, 2009), at 57-58; E Knorr, “Origin of the Patents” (2001) *MIT Technology Review* available at <https://www.technologyreview.com/401134/origin-of-the-patents/>.

82 Drexl et al, Artificial Intelligence and Intellectual Property Law Position Statement of the Max Planck Institute for Innovation and Competition of 9 April 2021 on the Current Debate, pp 23-24, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3822924.

have been set by programmers or other human contributors to the AI system.⁸³

- 31 Overall, the court’s proposition that AI can autonomously invent has not been supported by sufficient evidence. Further facts are required to determine the exact nature and scope of contributions made by the designer of the system. These are likely to demonstrate that human contribution is instrumental for an AI module to generate the desired outputs.

II. AI-generated inventions should be patentable

- 32 The next proposition that underlies the court’s decision, is that inventions autonomously generated by AI (if they are possible at all) should be patentable in the same way as human inventions.⁸⁴ The question whether AI-generated inventions should be patented has been broadly discussed in various jurisdictions and among different stakeholders without reaching an overall consensus.⁸⁵ Whilst patent offices and courts that have dealt with this case have avoided discussing this policy question,⁸⁶ Beach J expressed his views clearly.

- 33 His Honour held that AI-generated inventions should be patentable for two main reasons: 1) this would encourage innovation that the *Patents Act* (and the Objects provision) is designed to promote;⁸⁷ and, 2) patent protection would encourage the disclosure

83 See similar Fraser (n 2) 323.

84 *Thaler v Commissioner of Patents* [2021] FCA 879 [124].

85 See eg US Patent and Trade Mark Office ‘Public Views on Artificial Intelligence and Intellectual Property Policy’ (October 2020), https://www.uspto.gov/sites/default/files/documents/USPTO_AI-Report_2020-10-07.pdf. WIPO Revised Issues Paper on Intellectual Property Policy and Artificial Intelligence (May 29, 2020), https://www.wipo.int/meetings/en/doc_details.jsp?doc_id=499504; UK Intellectual Property Office ‘Government response to call for views on artificial intelligence and intellectual property’ (as updated on 23 March 2021), <https://www.gov.uk/government/consultations/artificial-intelligence-and-intellectual-property-call-for-views/government-response-to-call-for-views-on-artificial-intelligence-and-intellectual-property>.

86 For instance, the EPO, when confronted with this argument, avoided commenting on this policy issue and simply repeated that the formal requirement to state an inventor who is a natural person should be met. EPO decision of 27 Jan 2020 on EP 18 275 163 and EPO decision of 27 Jan 2020 on EP 18 275 174, para 37.

87 *Thaler v Commissioner of Patents* [2021] FCA [122-125].

of inventions to society which would otherwise be kept secret.⁸⁸ In addition, Beach J discounts the possible risks of such protection, such as proliferation of patent applications.⁸⁹ Whilst some of the reasoning provided by the court might hold truth, it is submitted below that the discussion is not comprehensive and, thereby, not persuasive as it does not assess all of the reasons and possible impacts of such a policy decision on various private and public interests. It is argued that it would be more appropriate to discuss and address this policy question at a political level involving all relevant stakeholder groups.

1. It is uncertain whether patentability of AI-generated inventions will lead to more innovation

- 34 First, the court reasons that listing AI as an inventor, and thus allowing patents over AI-generated inventions, is consistent with the objects of the *Patents Act* to incentivize innovation.⁹⁰ Arguably, allowing patents over AI-generated inventions would incentivize computer scientists to develop inventive machines and others to facilitate the production and use of outputs produced by such machines, which would then contribute to the economic wellbeing of the society.⁹¹

- 35 Stimulation of innovation is a primary rationale of patent law⁹² and, at first instance, this argument might sound convincing. Indeed, for some industries which require immense investment to innovate, such as the pharmaceutical industry, patent protection might be instrumental in promoting investment.⁹³

88 *Ibid* [130].

89 *Ibid* [133].

90 S. 2A Patent Act 1990 (the object of the Patent Act is to “promote[...] economic wellbeing through technological innovation and the transfer and dissemination of technology (...).”

91 *Thaler v Commissioner of Patents* [2021] FCA [125]; See similar Fraser (n 2) 326 (“On its face, widening patentability to include inventions generated autonomously by computers would provide an incentive that would accelerate innovation and generate exponentially more inventions quicker, while requiring less skill and fewer resources than would otherwise be possible”), see also B Hattenbach and J Glucoft, “Patents In An Era Of Infinite Monkeys And Artificial Intelligence” 9 *Stanford Technology Law Review* 32 (2015)

92 Fraser (n 2) 321-322; R Plotkin (n 80) 130.

93 See, e.g. Henry Grabowski, ‘Patents, Innovation and Access to New Pharmaceuticals’, 2002 5(4) *Journal of International*

Similarly, it could be argued that if AI-generated outputs cannot be patented and would simply fall into public domain, individuals or companies would not be motivated to invest in developing AI systems in the first place.

36 On the other hand, the ability of patent law to stimulate innovation has been repeatedly challenged, which suggests that patent law's ability to encourage innovation in AI sector is not without doubt either. For instance, some economists have previously suggested that there is no clear empirical evidence on whether the patent system encourages innovation.⁹⁴ Others have argued that patents might even impede innovation in certain sectors, such as the software industry, or may preclude small and medium sized companies from entering markets that are thick with patented technologies.⁹⁵ Therefore, scholars argue that IP rights should be granted only when there is a clear market failure.⁹⁶ These general arguments could be used in challenging the proposition that patent law protection for AI-generated inventions (if they were possible in the first place) is required to ensure the growth of AI industries.⁹⁷

37 In addition, patent law is not only about incentivizing innovation and economic prosperity (the utilitarian rationale reflected in S2A Patents Act) but also about recognizing and rewarding human ingenuity.⁹⁸ International human rights instruments require countries to protect "moral and material interests resulting from any scientific, literary or artistic production of which he is the author".⁹⁹ Whilst this

Economic Law 849.

94 See, e.g. *Boldrin*, Michele and *Levine*, David K. and *Levine*, David K., *The Case Against Patents*. Michele *Boldrin* and. David K. *Levine*, Working Paper 2012-035A <http://research.stlouisfed.org/wp/2012/2012-035.pdf>.

95 With relation to software patents, see William M. Landes & Richard A. Posner, *The Economic Structure of Intellectual Property Law* 312–13 (2003).

96 *Drexel et al* (n 6) para 16.

97 It is interesting to note that all examples of AI applications that Beach J mentions in the context of pharmaceutical industry concerns situations where AI is used as a tool to assist in innovation process rather than as a device capable of autonomous invention, see *Thaler v Commissioner of Patents* [2021] FCA 879 [44-57].

98 See 'moral' rationale of IP rights discussed in *Stewart et al*, *Intellectual Property Law in Australia* (6th ed Lexis Nexis 2018) [1.30].

99 Art 27(2) of the United Nations Universal Declaration of Human Rights, 10 December 1948.

does not prevent states from developing patent laws that also protect non-human innovation, the question arises of how awarding an AI system with inventor status will affect human innovation and the protection of human rights and interests in the innovation process. Some have argued that allowing patents over AI-generated inventions (as opposed to AI-assisted inventions) may undermine human inventorship, the role that humans play in innovation, as well as their recognition and reward under patent law.¹⁰⁰

38 While this proposition would require further investigation, one point needs to be emphasized here. As argued above, humans invest a significant amount of intellectual effort in designing the AI modules, their tasks, and the ways they must perform those tasks. In short, humans make a very significant and important contribution to the outputs generated by AI. If those human contributors are not acknowledged and rewarded for the outputs produced by AI, it is questionable whether that would be compatible with international human rights instruments requiring the protection of moral and material interests of humans resulting from their scientific endeavours.

2. Absence of patentability will not necessarily result in secrecy

39 Further in its reasoning, the court stated that "[w]ithout the ability to obtain patent protection, owners of creative computers might choose to protect patentable inventions as trade secrets without any public disclosure."¹⁰¹

40 Disclosure of an invention to the public is one of the central tenets of the patent law system. Disclosure stimulates and incentivizes further innovation, reduces duplication, and enables effective investment in innovation.¹⁰² That said, one should recognize that trade secret protection, or the protection of confidential information, is limited in a number of ways, and might not be available to at least some AI-generated inventions.¹⁰³ For example, trade secret pro-

100 For a brief discussion see *Abbott* (n 2) 1117-1121.

101 *Thaler v Commissioner of Patents* [2021] FCA 130; see also *Abbott* (n 2) 1103-1104.

102 *Fraser* (n 2) 322; see also B Roin, "The Disclosure Function of the Patent System (or Lack Thereof)" (2005) 118 *Harvard Law Review* 2007-2028, at 2009.

103 see *Katarina Foss-Solbrekk*, "Three routes to protecting AI systems and their algorithms under IP law: The good, the bad and the ugly", *Journal of Intellectual Property Law and Practice* 2-3 (2021), at 12; *Ana Nordberg*, "Trade secrets, big data

tection affords no protection against reverse engineering.¹⁰⁴ The inventions generated by DABUS – the fractal container and the signal light – could be easily reverse engineered when they reach the market, whereby the owner, wishing to commercialize these inventions, would not be able to rely on trade secret protection. If a patent is not granted in such situations, the owner would have to rely on other forms of protection (e.g. consumer and competition laws, contracts) and develop commercialization strategies that do not rely on exclusive rights.

- 41 As a result, absence of patent protection for AI-generated inventions will not necessarily result in all such inventions being protected by trade secrets that might last for indefinite period of time, as envisaged by the court. Due to limited scope of trade secret protection, some inventions, including the ones generated by DABUS, would not be able to benefit from trade secret protection and thus would be disclosed to the public as soon as they are released on the market. This suggests that, instead of leading to more secrecy, the absence of patent protection for AI-generated inventions might lead to earlier disclosure of invention to the public, at least with relation to certain inventions, which might further encourage innovation and competition in the field.

3. Not all risks have been taken into account

- 42 Justice Beach addressed some of the concerns relating to patenting computer-generated inventions. For instance, his Honour made reference to a submission that if these AI patents are permitted, the patent system will potentially reach breaking point simply because the algorithms will produce innumerable novel inventions.¹⁰⁵ His Honour ‘dispose[s] of these phantoms’ by proffering that only a legal person can make a patent application and be granted a patent.

and artificial intelligence innovation: a legal oxymoron?’, in Jens Schovsbo, et al (eds), *The Harmonization and Protection of Trade Secrets in the EU: An Appraisal of the EU Directive*, 210 (2020), at 212.

104 See, e.g., Nari Lee, ‘Protection for artificial intelligence in personalised medicine – the patent/trade secret tradeoff’, in Jens Schovsbo, et al (eds) *The Harmonization and Protection of Trade Secrets in the EU: An Appraisal of the EU Directive* 267–294, 267 (Edward Elgar Publishing Limited, 2020).

105 *Thaler v Commissioner of Patents* [2021] FCA 879 133; see similar *Fraser* (n 2) 322–323; *R Plotkin* (n 80) 9, 135.

Therefore, this legal person will have the ultimate control and title over a patented invention.¹⁰⁶

- 43 Whilst the court is correct to suggest that AI will not be able to autonomously apply to patent the inventions it generates, that is not a satisfactory answer to a broader possible challenge to which the court is referring. Namely, autonomous systems could create thousands of inventions in a small field, potentially resulting in a concentration of patent ownership by those with access to those systems.¹⁰⁷ This could make it difficult (if not impossible) for competing companies (especially SMEs) to enter the field, resulting in a stifling of innovation.¹⁰⁸ These issues have not been identified by the judge but they ought to be considered when developing patent law policy around new type of inventions, such as those generated by AI.
- 44 Further, the judgment does not address multiple other challenges that patenting AI-generated inventions might cause. Commentators have suggested that computer-generated inventions would have a negative effect on human inventiveness and may eliminate high-quality R&D jobs or entire R&D industries.¹⁰⁹ The acceleration of innovation through autonomous inventing machines might arguably lead to the disruption of the innovation cycle, while an increasing number of computer-generated inventions could accelerate natural resource consumption.¹¹⁰ Others have argued that, from an economic perspective, the availability of patents for inventive machines would be a sufficient incentive as they

106 *Thaler v Commissioner of Patents* [2021] FCA 879 [133]

107 Jamie Carter, *The Most Powerful Supercomputers in the World—and What They Do*, TECHRADAR (Dec. 13, 2014), <http://www.techradar.com/us/news/computing/the-most-powerfulsupercomputers-in-the-world-and-what-they-do-1276865> (noting that most advanced computer systems are owned by governments and large businesses)

108 *Fraser* (n 2) 327; see also *R Plotkin* (n 80) 7.

109 See *Fraser* (n 2) 327; Ryan Abbott, ‘Hal the Inventor: Big Data and Its Use by Artificial Intelligence’, in Cassidy R. Sugimoto, Hamid R. Ekbia & Michael Mattioli (eds), *Big Data is Not a Monolith* (MIT Press 2016), at 13; Abbott (n 2) 34; L Floridi, *The Fourth Revolution: How the Infosphere is Reshaping Human Reality* (Oxford: OUP, 2014), at 129; Vertinsky & Rice (n 3) 586.

110 *Fraser* (n 2) 327; S Anthony, ‘Innovation Gone Overboard’ (2008) *Harvard Business Review* available at <https://hbr.org/2008/03/innovation-gone-overboard/>; Fast Company, ‘Is Too Much Industry Innovation a Bad Thing?’ *Fast Company* available at https://www.fastcompany.com/66620_1/too-much-industry-innovation-bad-thing; P Marks, ‘Eureka Machines’ (2015) 227 *New Scientist* 32–35.

would require much more effort to produce than the inventions they would generate. In such situations, an additional level of monopoly would be an overkill.¹¹¹

- 45 It is unnecessary to provide an exhaustive list of possible challenges or assess any of these claims here. Instead, it is suggested that the question whether AI-generated inventions (if they become possible at all) should be patented or not is a significant policy question that needs to be answered by identifying and weighing a variety of private and public interests. This is not a discussion to be carried out by a single judge assessing one patent application. It should be undertaken at policy level, where all Australian stakeholders are afforded the opportunity to be heard on the issue of AI inventiveness and patentability of AI-generated inventions in a transparent and public manner.¹¹²

D. Recognizing an 'AI inventor' is compatible with the Patent Act

- 46 The third general argument that the court pursues is that there is nothing in the *Patents Act* that prevents AI from being listed as an inventor.¹¹³ In particular, his Honour rejected the Commissioner's argument that a broad interpretation of inventor would be incompatible with section 15(1) of the Act. According to the Commissioner, if an AI system could be deemed to be the 'inventor', it would prove difficult to establish the owner of such AI-generated inventions under section 15(1). Rejecting this argument, his Honour held that section 15(1) should be construed broadly so that the owner of the AI would be entitled to the ensuing patents from the AI-generated inventions. It is submitted that interpretation of section 15(1) is simply too broad and legally unsupported.

I. Section 15(1)(a)

- 47 His Honour referred to section 15(1)(a) which provides a patent may be granted to 'a person who is the inventor'. Beach J held that under this sub-section,

tion, the inventor can only be a person.¹¹⁴ His Honour stated that:

- 48 "[this] limb is not triggered in the present case because DABUS is not a person. Section 15(1)(a) does however demonstrate that the concept of a "person" is different to an "inventor". Moreover, it is a fallacy to argue from s 15(1)(a) that a non-human, indeed a non-person, cannot be an inventor. It could be, but it could not be granted a patent."¹¹⁵
- 49 Essentially, his Honour held that s15(1)(a) would apply only in situations when an inventor is a person and would *not* apply in situations when an inventor is a thing, such as an AI machine. When an inventor is an AI system, the patent could be granted pursuant to section 15(1)(b) or (c).¹¹⁶
- 50 This interpretation causes a two-fold problem. First, it leads to different treatment of 'human inventors' and 'AI inventors' under the *Patents Act*. As the court noted, there is a number of *Patents Act* provisions which clearly refer to human inventors (eg s 172(1), 182(3) and 185(a)).¹¹⁷ These provisions, following the reasoning of the court, would not apply to 'AI inventors'. This would lead to different treatment of human inventors and AI inventors. For instance, according to s 172(1), "an *inventor*, or an inventor's successor in title, may *assign* the invention and any patent granted or to be granted for the invention, to the Commonwealth" (Italics added). Since, as his Honour agrees, AI is not capable of *assignment*, this provision would apply to a human inventor but not apply to an AI inventor.¹¹⁸ This demonstrates a second problem resulting from such interpretation. Namely, the *Patents Act* in many instances relies on the assignment of rights as the main- and sometimes only- way of transferring rights from the inventor to another person. Since AI is not capable of assigning the rights, a number of provisions under the *Patents Act*, such as 172(1) discussed above, would be rendered ineffective in an 'AI inventor' scenario.

111 Fraser (n 2) 327; B Hattenbach and J Glucoft, 'Patents In An Era Of Infinite Monkeys And Artificial Intelligence' (2015) 19 *Stanford Technology Law Review* 32-51, at 50; Abbott (n 110) 13; Abbott (n 2) 34.

112 Governments in other jurisdictions (US, UK) and international organizations (WIPO) have already been running public consultations in this area, see discussion in section I.

113 *Thaler v Commissioner of Patents* [2021] FCA 879 [118].

114 *Ibid* [160].

115 *Ibid*.

116 See discussion below.

117 *Thaler v Commissioner of Patents* [2021] FCA 879 [212].

118 Since AI cannot transfer rights to anyone, the 'successor in title' who could rely on this provision would not exist either.

II. Section 15(1)(b)

- 51 After finding that s 15(1)(a) would not be applicable in an ‘AI inventor’ scenario, Beach J went on to state that Dr Thaler could possibly be granted a patent under s 15(1)(b). This section provides that a patent could be granted to a person who “would, on the grant of a patent for the invention, be entitled to have the patent assigned to the person”. Whilst the Commissioner submitted that this sub-section requires an assignment of rights, which AI cannot perform, the court concluded that “s 15(1)(b) does not necessarily require any assignment from the inventor at all”.¹¹⁹ Accordingly, Dr Thaler could be granted a patent under this section because he is entitled to it under the common law doctrines of accession or possession.¹²⁰ These doctrines were relied upon by the applicant at first instance, who submitted that the “general rule that the owner of a thing is the owner of the fruits of that thing, much like the owner of a fruit tree is entitled to the fruit produced by that tree”.¹²¹
- 52 By permitting the applicant to rely on the doctrines of accession or possession as a part of s 15(1)(b), the court proposes a construction which goes beyond the explicit literary scope of the provision. The Commissioner argued that the provision explicitly requires that a patent can be granted only to a person who is ‘entitled to have the patent *assigned*’ to him/her (*Italics added*), and nothing in the provision suggests that it allows the entitlement in the patent to be derived by way other than the assignment.¹²² To the contrary, Beach J held that the inventor does not necessarily need to be involved in the assignment.¹²³ However, the provision expressly refers to ‘assignment’ to which the person should be entitled, not to any other form of transfer of rights (such as based on accession or possession doctrines). As AI cannot assign rights, with which his Honour agrees, and the provision does not envisage any other ways how entitlement could be secured, this provision, arguably, cannot apply in an ‘AI inventor’ scenario.

119 *Ibid* [168].

120 *Ibid* [167] (“the ownership of the work of the artificial intelligence system is analogous to ownership of the progeny of animals or the treatment of fruit or crops produced by the labour and expense of the occupier of the land (*fructus industrialis*), which are treated as chattels with separate existence to the land”).

121 *Stephen L. Thaler* [2021] APO 5 [2].

122 *Ibid* [26].

123 *Thaler v Commissioner of Patents* [2021] FCA 879 [169-175].

III. Section 15(1)(c)

- 53 Finally, it is submitted that the court erred in finding that s 15(1)(c) could apply in an AI-inventor scenario, e.g. that the requirements under this provision could be fulfilled in order for AI owner (or any other person) to be granted a patent over an AI-generated invention.
- 54 Section 15(1)(c) provides that a patent may be granted to a person who “derives title to the invention from the inventor or a person mentioned in paragraph (b)”. In other words, the person could be granted a patent if s/he can prove that they have derived (acquired) a title (ownership) of the invention either from the inventor or another person who was entitled to get the patent assigned to them (normally, the employer).
- 55 In contrast to s 15(1)(b) that refers to assignment as the only way of securing the entitlement, s 15(1)(c) does not mention the exact way how the title could be derived. Keeping this in mind, Beach J held that “[t]he language of s 15(1)(c) recognises that the rights of a person who derives title to the invention from an inventor extend beyond assignments to encompass other means by which an interest may be conferred.”¹²⁴ His Honour then went on to state that this allows derivation of the title based on the common law doctrine of accession or possession (discussed above): “Dr Thaler is a person who derives title from the inventor, DABUS, by reason of his possession of DABUS, his ownership of the copyright in DABUS’ source code, and his ownership and possession of the computer on which it resides.”¹²⁵
- 56 There are a few problems with the construction of the provision as proposed by Beach J. Firstly, according to s 15(1)(c), the title should be derived “from the inventor”. It is questionable how the grantee could derive the title into the invention *from* AI when AI does not have a legal status and, thus, cannot own the title in the first place. This was also the argument adopted by the Deputy Commissioner at first instance.¹²⁶

- 57 Secondly, whilst the doctrine of accession or possession generally applies in relation to tangible property, there is no precedent as an authority for a proposition to be advanced that mere possession of a thing would allow one to derive legal title to the *intangible* assets produced by that thing. In the UK case of *Thaler v Comptroller-General*, Arnold LJ cited

124 *Ibid* [178].

125 *Ibid* [187-194].

126 *Stephen L. Thaler* [2021] APO 5 [30].

*Blackstone's Commentaries on the Laws of England*¹²⁷ and concluded that the doctrine of accession applies with relation to tangible property but not to intangible property, such as intellectual property rights.¹²⁸ As stated by Arnold LJ, one of the possible justifications could be that intangibles are non-rivalrous goods (consumption by one does not preclude simultaneous consumption by others) and, thus, are not susceptible of exclusive possession. Therefore, exclusive possession of the tangible property does not lead to exclusive possession of the intangible property produced by it.¹²⁹ As noted by Arnold LJ, Dr Thaler was unable to cite any authority in which the doctrine of accession had been applied to a new intangible produced by existing tangible property.¹³⁰ The applicant also submitted at the Appeal hearing that it was possible to conjure up other instances where the doctrine of accession clearly did not apply to a new intangible produced by existing tangible property.¹³¹ Arguably, this demonstrates that there is currently no agreed upon universal legal basis for applying the doctrine of accession with relation to intangible assets, such as patent rights.

- 58 Overall, contrary to what Beach J held, I argue that the *Patents Act* is not currently suitable to accommodate AI-generated inventions. If the term 'inventor' is given a broad reach to include AI as a potential inventor, then for the reasons given, section 15 would become flawed, and it would not be possible to identify a person who would be entitled to be granted an AI-generated patent.

E. Conclusions

- 59 Whilst the decision in *Thaler v Commissioner of Patents* was welcomed by those in favour of the concept of an 'AI inventor', the decision is questionable from a number of perspectives, and it is unclear whether it will withstand scrutiny when the appeal is heard by the Full Federal Court in 2022. The decision is driven by two assumptions, both of which are open to challenge: first, that AI systems are currently capable of autonomous inventions and, second, that such inventions should necessarily be protected

by patent law. Relying on those assumptions, the court suggests a broad interpretation of the 'inventor' concept, which encompasses AI systems as inventors. In order to accommodate this extension under the *Patents Act*, the court adopted an overly broad interpretation of s15(1). The court's attempt to augment the legal grounds for granting patent rights by incorporating the common law doctrine of accession under both s15(1)(b) and s15(1)(c) are unconvincing. The current Australian *Patent Act* is not suited to accommodate AI as an inventor and, if AI is to become a legal inventor, the Act would need to be reviewed accordingly. Most importantly, the decision on whether it should be possible to list AI as an inventor in the patent application has major policy implications. Thus, this debate should take place not in courts but in policy making institutions and should engage all interested stakeholders in an open and transparent debate.

Note: This manuscript was accepted for publication in December 2021.

127 *Blackstone's Commentaries on the Laws of England* (Clarendon Press, 1766), Book II, Chapter 26, paragraph 6, pages 404-405.

128 *Thaler v The Comptroller-General of Patents, Designs And Trade Marks* [2021] EWHC Civ 1374 [131-132].

129 *Ibid* [133].

130 *Ibid* [134].

131 *Ibid* [135].