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## Machine Versus the Tax Man: AI Inventors and the Research Tax Credit



BY ROBERT J. KOVACEV

On July 29, 2019, the U.S. Patent and Trademark Office received two patent applications: one for a light beacon that flashes in a unique manner to attract attention, and the other for a beverage container based on fractal geometry. USPTO Applications No. 16/524,350 & 16/524,532. These were not ordinary patent applications. The sole inventor listed on the applications was DABUS, an advanced AI algorithm billed as a “creativity machine.” The inventions described in these patent applications were developed by DABUS without human intervention.

The USPTO ultimately denied these patent applications on the ground that an “inventor” must be a natural person under 35 U.S.C. Section 100(f). In re Application No. 16/524,350 (Apr. 22, 2020) <https://www.uspto.gov/sites/default/files/documents/1652435022apr2020.pdf> Yet, paradoxically, the human responsible for creating DABUS, Stephen Thaler, could not be the inventor because he personally did not create the invention—DABUS did. Therefore, an invention which would otherwise have enjoyed patent protection was denied that protection solely because the inventor was an AI algorithm. The USPTO decision is currently being challenged in federal court. *Thaler v. Iancu*, No. 1:20-cv-903 (E.D. Va.).

The importance of the DABUS patent applications has been widely discussed in intellectual property and technology circles. See, e.g., Ryan Abbott, *Everything Is Obvious*, 66 UCLA L. REV. 2, 23-28 (2019). Of all the ramifications of the DABUS patent application contro-

versy, the tax implications may seem nonobvious. But in the context of research tax credits, the issues raised by DABUS highlight an unanswered question: can a taxpayer claim research credits for inventions created by an AI inventor, without direct human intervention?

Tax code [Section 41](#) creates a “credit for increasing research activities.” The amount of research credit is determined by reference to a percentage of “qualified research expenses.” Section 41(a). A threshold question is whether the AI inventor is conducting “qualified research.” In summary, an activity is qualified research if it satisfies a four-part test: the activity must be (1) undertaken for the purposes of discovering information which is technological in nature, (2) to resolve uncertainty, (3) in order to be useful in a new or improved business component, (4) by using a process of experimentation. Section 41(d)(1); Treas. Reg. Section 1.41-4(a).

The first three factors are dictated by the nature of the project. The use of an AI inventor, as opposed to a human inventor, does not affect whether a project addresses uncertainty, or is technological in nature, or would be useful to a business process or product. As to the fourth factor, while an AI inventor does not engage in precisely the same thought processes as a human inventor in addressing a problem, it clearly engages in “a process designed to evaluate one or more alternatives to achieve a result.” Treas. Reg. Section 1.41-4(a)(5)(i). Indeed, that is the very nature of machine learning—an iterative process evaluating many times more alternatives in one second than a human could do in a lifetime.

There is an exclusion in Section 41 and attendant regulations providing that so-called “internal use software” must meet a higher threshold in order to qualify. Section 41(d)(4)(E) & Treas. Reg. Section 1.41-4(c)(6). This is one of the major flash-points of controversy between the IRS and taxpayers concerning research cred-

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its for software development. Again, however, the applicability of this exclusion hinges on the functionality of the ultimate product (i.e., is it designed solely to benefit internal general or administration functions). Treas. Reg. Section 1.41-4(c)(6)(iii). The nature of the inventor is irrelevant to that inquiry.

In short, nothing in the statute or regulations states that the activities must be performed by humans in order to qualify. There are several other technical requirements, including that the taxpayer be able to substantiate the nature of the research activities. Assuming those requirements are met, it is likely that the activities of an AI inventor should constitute qualified research activities under Section 41.

There is another issue that must be addressed, however. The U.S. research credit regime is tied to the amount of expenses incurred in performing qualified research activities, not to the value or benefit provided by the activities themselves. Section 41 divides “qualified research expenses” into two categories: in-house research expenses and contract research expenses. Section 41(b)(1)(A) & (B). Of course, a taxpayer must be able to substantiate both the amount of expenses and that they were incurred in the performance of qualified research activities, and there are many complex computational issues, but those issues are beyond the scope of this article.

Contracting with a third party to use that party’s AI inventor for research provides the easier path. Section 41(d)(3)(A) defines contract research expenses as “any amount paid or incurred by the taxpayer to any person (other than an employee of the taxpayer) for qualified research.” This would include contracting with a third party to develop software. Treas. Reg. Section 1.41-2(e)(5) Ex. 5. It also requires that the expenses be reduced to 65% (75% in the case of certain research consortia) before calculating the credit. (There is an exception to this haircut rule for certain expenses related to energy research.)

An AI inventor is not a “person” under current tax law. Section 7701(a)(1). But an individual or entity owning such a program would be a “person.” A business entity with one employee and an AI inventor would seem to satisfy this requirement. And while the statute requires that the contract research expenses be related to “qualified research,” it does not specify that the contractor itself must use human labor to perform that research. It does, however, require that the contract research take place within the U.S. Section 41(d)(4)(F). Ironically, a taxpayer who “rents” an AI inventor from someone else may receive a research credit for 65% (or more) of the cost of using that algorithm.

The analysis for using an in-house AI inventor is less straightforward. In-house research expenses must fall into one of three categories: “any wages paid or incurred to an employee for qualified services performed by such employee,” “any amount paid or incurred for supplies used in the conduct of qualified research,” or “any amount paid or incurred to another person for the right to use computers in the conduct of qualified research.” Section 41(b)(2)(i)-(iii).

An AI program does not earn “wages,” at least as that term is currently understood in tax law. There are advocates for recognizing a legal personality for advanced AI, and some of those proposals encompass AI earning wages (and paying taxes). To date, no such leg-

islation has been adopted in the U.S., however, so it is safe to assume that a taxpayer does not pay wages to AI for purposes of Section 41.

Of course, if human employees are involved in developing, programming, and operating an AI inventor, an allocable portion of their wages could be qualified research expenses. Treas. Reg. Section 1.41-2(c)(1) & (2) & (d)(1). By definition, however, an AI inventor is designed to be largely autonomous. In theory, the algorithm would not even require human intervention to identify what to research in the first place. So once the AI inventor is up and running, there may be few, if any, qualifying research expenses arising from “wages” of employees, even though the AI inventor may be several times more productive than an army of human researchers whose wages would qualify.

Operation of an AI inventor algorithm may generate qualifying support costs, however. There may be costs incurred in purchasing hardware to operate the AI inventor that qualify. Advanced algorithms often use considerable amounts of electricity that may qualify as “extraordinary expenditures for utilities,” provided the taxpayer can segregate and substantiate the electricity used for that purpose. Treas. Reg. Section 1.41-2(b)(2)(ii).

There may also be qualified research expenses under the “time-share” rule. “[A]mounts paid or incurred to another person for the right to use (time-sharing) computers in the conduct of qualified research” is a qualified research expense. Treas. Reg. Section 1.41-2(b)(4). The computer must be owned and operated by a third party, located off the taxpayer’s premises, and shared with other users such that the taxpayer is not the primary user of the computer. This rule is tailor-made for cloud computing. Expenses that would otherwise be non-qualifying general overhead if performed internally may become qualifying expenses if paid to a cloud service provider. Locating an AI inventor in the cloud thus provides a potential tax benefit compared to hosting it internally.

It is clear that a taxpayer using an AI inventor may qualify for research credits. That being said, the amount of credit will likely not be proportional to the value of the research the AI inventor produces. The current U.S. research credit places a premium on human effort. The current regime thus perversely subsidizes inefficient research, while punishing taxpayers using the most advanced AI tools. As technological change is driven less by human researchers and more by AI, the research credit must develop an alternative method for incentivizing research beyond a rote calculation based on wage and supply expenses. The value of an AI inventor’s research may be more difficult to quantify than the amount of hours a human researcher works. Nonetheless, policymakers must make an effort to understand, and appropriately incentivize, research performed by AI in order to serve the purposes of the research credit.

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