

# The opportunities and challenges of Artificial Intelligence to the Tax Profession

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Benjamin Walker\*

## Abstract

The article critically examines the use of Artificial Intelligence that interprets tax law and provides probabilistic answers. The traditional domains of human cognitive function such as reasoning and logic are slowly being replaced by Artificial Intelligence, which can replicate certain end results using complex algorithms. Artificial Intelligence is the most significant new wave technology that is changing the professional landscape. There are two benefits of AI: Increased legal certainty and wider access to tax services. An AI tool offers special promise for tax administrations. However, two deadly problems exist: limitations of data and a fundamental threat to the judicial system.

**Key words:** artificial intelligence, tax profession, machine, technology, interpretation

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\*Dr. Benjamin Walker LLB, BCom (Otago), LL.M. (Vienna), PhD (Vienna), Senior Lecturer at the School of Accounting & Commercial Law, Victoria University of Wellington. The author thanks Scott Wilkie and Casey Plunkett for the helpful discussions.

## I. Introduction

The relationship between technology and law is an exciting area of research that is becoming more relevant as technology increasingly pervades our lives. There are three broad strands of legal literature.<sup>1</sup> First, the application of law to new industries, e.g. self-driving cars. How do we tax such a car? A labour or a service? Second, how legislation is created. Third, the delivery of legal services. The article develops the third strand of literature by exploring the use of Artificial Intelligence ('AI') that interprets tax law and provides probabilistic answers to factual scenarios.<sup>2</sup> However, a key distinguishing factor of the tax profession is the prevalence of non-lawyers providing services. Given the economic nature of tax, economists and accountants are useful for clients solving tax issues. Hence, a nuanced approach recognising the contribution of non-lawyers is necessary. Lawyers and non-lawyers could theoretically apply this technology.

There are a wide range of articles that outline both the opportunities and challenges of technology to legal services more broadly. However, this area is sparsely explored by tax academics and the potential impact for the tax profession is significant. Proponents of AI view AI as almost a saviour to the tax profession while conveniently selling the product, however, the article refutes this optimism, and paints a bleak picture for tax administrations and governments should they ignore these technological developments. More fundamentally, the use of AI to interpret tax law and provide probabilistic answers, is a threat to the entire judicial system if the technology supersedes human judgment. Part II outlines the basic mechanics of AI and the application of AI across time. Part III explores the alleged benefits of AI. Part IV directly refutes the alleged benefits of AI, and critically

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<sup>1</sup> Benjamin Alarie, Anthony Niblett and Albert Yoon, 'Using Machine Learning to Predict Outcomes in Tax Law' (December 15, 2017) 19-20 <<https://ssrn.com/abstract=2855977>>.

<sup>2</sup> For example, Person A sells clothes online in her spare time and is unsure whether her gains from sale are taxable, thus, she hires tax advisor X. Tax advisor X uses an AI tool by answering specific questions from Person A that ascertain whether her gains are taxable. The AI tool states that Person A's gains have a 20% chance of being taxable based on the AI analysis.

analyses the consequences of adopting such technology. Part V concludes with the key arguments of the article and a warning to policy makers.

## II. Artificial Intelligence

### a. Growth of AI

The rate of current technological change is exponential.<sup>3</sup> Computer power is doubling every two years.<sup>4</sup> Some predict that computers could have the capacity of a human brain in twenty years.<sup>5</sup> AI is currently the hottest buzzword and empty platitudes are never in short supply from private actors seeking to profit from the technology.<sup>6</sup> AI is broadly understood as the application of human cognitive functions by machines. AI has two broadly understood categories. First, Narrow Artificial Intelligence ('NAI') is where machines perform narrow tasks defined by the programmers that optimizes a certain goal. There are famous examples of machines using NAI to outperform humans. Deep Blue defeated Garry Kasparov at chess in 1997. IBM Watson overcame the best two human players of 'Jeopardy!' in 2011. More recently, Google AlphaGo defeated a world champion at the game of Go, a popular Asian game involving complex mental calculations. These machines were able to complete tasks with one goal: defeat the opponent. AI has been used for language translation, speech and computer visions.<sup>7</sup> Algorithms have been used in the United States to decide whether to

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<sup>3</sup> Gordon Moore, 'Moore's law' in David C. Brock (ed), *Understanding Moore's Law: Four Decades of Innovation* (Chemical Heritage Foundation, 2006), 67–84.

<sup>4</sup> Benjamin Alarie, Anthony Niblett and Albert Yoon, above n 1, 7.

<sup>5</sup> Ray Kurzweil, *The Singularity is Near: When Humans Transcend Biology* (Viking Press, 2005), 167-181.

<sup>6</sup> See: KPMG, 'Artificial Intelligence to Transform the World', (March 20, 2018), <<https://home.kpmg.com/au/en/home/media/press-releases/2017/05/artificial-intelligence-to-transform-tax-world-3-may-2017.html>>; HR Technologist, '4 Ways AI will Revolutionize the Tax Function', <<https://www.hrtechnologist.com/articles/taxation/4-ways-ai-will-revolutionize-the-tax-function/>>; Accenture, 'How Artificial Intelligence is Transforming Tax Administration', June 2017, <<https://www.taxadmin.org/assets/docs/Meetings/17am/volpi%20artificial%20intelligence.pdf>>;; Adelyn Zhou, Forbes, 'EY, Deloitte and PWC Embrace Artificial Intelligence For Tax And Accounting', <<https://www.forbes.com/sites/adelynzhou/2017/11/14/ey-deloitte-and-pwc-embrace-artificial-intelligence-for-tax-and-accounting/#1fc674f53498>>.

<sup>7</sup> Harry Surden, 'Machine Learning and Law' (2014) 89(1) *Washington Law Review* 87, 88.

grant bail or not.<sup>8</sup> There currently exists technology where a machine ('Tax 2.0') answers specific tax questions by interpreting law and providing probabilistic answers. Second, Artificial General intelligence ('AGI') is where machines solve any general problem, rather than a specific problem. Problems are autonomously identified and solved. Machines have not reached this level yet. Some predict that machines will gain GAI by 2100.<sup>9</sup> Tax 2.0 could potentially solve complex tax problems and even identify unforeseen problems. Some predict a radical transformation of tax professional work beyond 2050, which will be shaped by technological developments, but not necessarily GAI.<sup>10</sup>

This history of AI and tax is surprisingly long. The first use of AI & tax was seen in the 1970s. Thomas McCarty, the father of AI and law,<sup>11</sup> developed a tool for US corporate tax law aimed at company reorganisations called "Taxman".<sup>12</sup> Taxman could allegedly decide whether a company reorganisation in the USA was taxable or not. Tax was often viewed as a fit for AI as it is highly technical and complex. AI is better at solving these difficult "hard tasks", but bad at solving "easy tasks" such as basic motor functions of a toddler.<sup>13</sup> Despite the apparent suitability to AI, there has been little uptake of AI in the interpretation and application of tax law. Recent examples in other areas of practice such as litigation and contract law are notable. For example, a recent high-profile competition pitted 20 experience corporate lawyers against an AI application.<sup>14</sup> Their goal was to

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<sup>8</sup> Anthony Casey & Anthony Niblett, 'Self-Driving Laws' (2016) 66(4) *University of Toronto Law Journal* 429, 432; Benjamin Alarie, Anthony Niblett and Albert Yoon, above n 1, 5.

<sup>9</sup> Vincent C. Mueller and Nick Bostrom, 'Future Progress in Artificial Intelligence: A survey of Expert Opinion' in Vincel C. Mueller (ed.), *Fundamental Progress in Artificial Intelligence* (Springer International Publishing, 2016), 553-571.

<sup>10</sup> Benjamin Alarie, 'The Path of the Law: Towards Legal Singularity' (2016) 66(4) *University of Toronto Law Journal* 443, 453.

<sup>11</sup> Richard Susskind, 'Pragmatism and purism in artificial intelligence and legal reasoning' (1989) 3(1) *AI and Society* 28, 29.

<sup>12</sup> L. Thorne McCarty, 'Interim Reports on the TAXMAN Project: An Experiment in Artificial Intelligence and Legal Reasoning', in *Artificial Intelligence Techniques in Legal Problem Solving*, Stanford Law School (June 1973); L. Thorne McCarty, 'Reflections on "Taxman": An Experiment in Artificial Intelligence and Legal Reasoning' (1977) 90(5) *Harvard Law Review* 837.

<sup>13</sup> S.M. McJohn, 'Review of the 'Artificial Legal Intelligence'' (1998) 12 *Harvard Journal of Law & Technology* 241, 251-2.

<sup>14</sup> Jonathan Marciano, '20 top lawyers were beaten by legal AI. Here are their surprising responses', Hackernoon, <<https://hackernoon.com/20-top-lawyers-were-beaten-by-legal-ai-here-are-their-surprising-responses-5dafdf25554d>>; Jonathan Marciano, 'The Essential Guide to organizing an AI vs

find problems in five Non-Disclosure Agreements. The average time for the lawyer was 92 minutes. Whereas, the AI application took 26 seconds. These examples illustrate the potential benefits of AI for legal services. However, the high cost of developing AI technology is a critical deterrent for most stakeholders, combined with the lack of demand from clients. Hence, use of AI is mainly restricted to catchy headlines and highly repetitive legal work.

## **b. Human v Machine**

The divide between humans and machines is slowly eroding. Machines outperform humans in memory, objectivity and logic.<sup>15</sup> Research indicates that formal algorithms outperform human judgment using a clinical method in the vast number of cases.<sup>16</sup> Algorithmic prediction models can present answers within seconds.<sup>17</sup> The uptake of machines in modern day life is a testament to their performance. Their level of performance is only increasing. In the past, AI was severely limited due to the lack of data. However, “greater quantification of observable phenomena in the world (‘more data’)”<sup>18</sup> has allowed “enhanced methods of machine learning through advances in computer assisted modelling and inference”.<sup>19</sup> AI can now learn or improve in performance over time within the realm of NAI.<sup>20</sup> More data or Big data has no universally accepted definition, but Big Data is generally understood as:

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Human Showdown’, Hackernoon, <<https://hackernoon.com/the-essential-guide-to-organizing-an-ai-vs-human-showdown-fe435701d755>>.

<sup>15</sup> Benjamin Alarie, above n 10, 7.

<sup>16</sup> William M. Grove & Paul E. Meehl, ‘Comparative Efficiency of Informal (Subjective, Impressionistic) and Formal (Mechanical, Algorithmic) Prediction Procedures: The Clinical-Statistical Controversy’ (1996) 2(2) *Psychology, Public Policy, and Law* 293.

<sup>17</sup> Benjamin Alarie, Anthony Niblett and Albert Yoon, above n 1, 5.

<sup>18</sup> Benjamin Alarie, Anthony Niblett and Albert Yoon, ‘Law in the Future’ (2016) 66(4) *University of Toronto Law Journal* 423, 425.

<sup>19</sup> *Ibid*, 423.

<sup>20</sup> Surden, above n 7, 88; Stuart Russel & Peter Norvig, ‘*Artificial Intelligence: A Modern approach*’ (2010), (Person Education Limited, 3<sup>rd</sup> edition, 2018), 693.

*“a term which refers to the enormous increase in access to and automated use of information. It refers to the gigantic amounts of digital data controlled by companies, authorities and other large organizations which are subject to extensive analysis based on the use of algorithms.”<sup>21</sup>*

Hence, data is becoming bigger by the day and organisations are attempting to capitalise on more data to improve various performance measures, and the overall improvement in AI performance.

The pertinent question is: What does AI offer the tax profession?

A key task of the tax professional is prediction. The tax professional must carefully understand the circumstances of a client and provide a prediction about the likely tax consequences. The tax professional will then advise the client on the best course of action. This prediction is critical to their role and some scholars argue that AI can improve prediction.<sup>22</sup> Others claim that AI prediction tools are superior to research from a lawyer.<sup>23</sup> Another task of the tax professional is providing support and reassurance for their important legal matters.<sup>24</sup> AI potentially offers the tax professional a better prediction for clients, but limited support and reassurance.

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<sup>21</sup> International Working Group on Data Protection in Telecommunications, ‘Working Paper on Big Data and Privacy: Privacy principles under pressure in the age of Big Data analytics’, Berlin Commissioner for Data Protection <[https://www.datenschutz-berlin.de/fileadmin/user\\_upload/pdf/publikationen/working-paper/2014/06052014\\_en.pdf](https://www.datenschutz-berlin.de/fileadmin/user_upload/pdf/publikationen/working-paper/2014/06052014_en.pdf)>. For a critical analysis of big data in taxation, see: K.A. Houser & D. Sanders, ‘The Use of Big Data Analytics by the IRS: Efficient Solutions or the End of Privacy as We Know It?’ (2017) 19 *Vanderbilt Journal of Entertainment & Technology Law* 4; F. Başaran Yavaşlar, *Tax Transparency - Preparatory materials, European Association of Tax Law Professors (EATLP)* (2018), <[www.eatlp.org/uploads/EATLP%202018-%20Panels%20%20and%204.pdf](http://www.eatlp.org/uploads/EATLP%202018-%20Panels%20%20and%204.pdf)>; M. Hatfield, ‘Taxation and Surveillance: An Agenda’ (2015) 17 *Yale Journal of Law & Technology* 319 <<https://yjolt.org/taxation-and-surveillance-agenda>>; Mazzoni argues that a balance between taxpayer privacy and public interest is required: Gianluca Mazzoni, ‘(Re)defining the Balance between Tax Transparency and Tax Privacy in Big Data Analytics’ (2018) 72(11) *Bulletin for International Taxation* 656.

<sup>22</sup> Benjamin Alarie, Anthony Niblett and Albert Yoon, above n 1, 3.

<sup>23</sup> Rhuan Barros, Andre Peres, Fabiana Lorenzi, Leandro Krug Wivesand Etienne Hubert da Silva Jaccottet, ‘Case Law Analysis with Machine Learning in Brazilian Court’ (2018) <[https://link.springer.com/content/pdf/10.1007%2F978-3-319-92058-0\\_82.pdf](https://link.springer.com/content/pdf/10.1007%2F978-3-319-92058-0_82.pdf)>

<sup>24</sup> Albert Yoon, ‘The post-modern lawyer: Technology and the democratization of legal representation’ (2016) 66(4) *University of Toronto Law Journal* 456, 469.

Prediction models vary from simple statistical method to complex neural networks. For example, Banana Co, resident in State A, has travelling salesmen conducting business operations in State B, and are anxious about creating a potential Permanent Establishment ('PE') in State B. One simple prediction model ('Model A') lists the relevant legal factors (let's assume three factors), and we weigh each factor appropriately using data (case law, etc.) analysed by humans. The humans must select the appropriate case law and weigh the appropriate factors of each case. It is an inherently time-consuming task and open to multiple data problems, which are explored in part II. A more advance prediction model ('Model B') is a multivariate regression analysis which estimates the relationship between the three factors and whether a PE is present. The most sophisticated model ('Model C') is where algorithms use deep neural networks. The algorithms can construct relationships between the outcome and relevant three factors. The algorithms construct relationships without human supervision. A prediction model was even developed that could predict (70-71% accuracy) the decisions of the Supreme Court of the United States based on using non-legal factors.<sup>25</sup> Therefore, AI could potentially predict legal outcomes better than a human. Before, a deeper analysis of the claim is provided, it is first necessary to analyse the specific tax AI tools that currently exist.

### **c. Application to tax law**

Tax law consists of many grey areas that consistently plague clients such as: Can I deduct amount X? Where am I tax resident? Does regularly selling goods on the internet in my spare time constitute a business? These questions are often unclear as the law often uses vague concepts that are judicially

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<sup>25</sup> Daniel Katz, Michael Bommarito and Josh Blackman, 'A general approach for predicting the behavior of the Supreme Court of the United States', PLOS ONE 12(4): e0174698 (2017) <<https://doi.org/10.1371/journal.pone.0174698>>

defined. Start-up companies are fiercely competing to offer automation and augmentation of these grey areas.<sup>26</sup>

The underlying AI technology that interprets law and provides probabilistic answers uses Application Programming Interface ('API'), which is a developing technology that uses "machine learning to textually analyse all the relevant sources and provide a probabilistic answer to that question."<sup>27</sup>

Kuźniacki developed an AI Tax Treaty Assistance to interpret the Principal Purposes Test recently introduced by the BEPS and the Multilateral Convention.<sup>28</sup> He uses Knowledge-Based AI relying on supervised learning classifier system (question-answer) combined with semi-supervised pattern recognition (information retrieval by reading contracts between companies and descriptions of existing or planned tax schemes) to provide a prediction tool for stakeholders.<sup>29</sup>

Alarie, Niblett & Yoon, in conjunction with Thomson Reuters, have developed a tool called "Blue J Legal" that can answer specific tax questions.<sup>30</sup> Blue J Legal tags words (verbs, nouns, etc.) from unstructured data to provide predictions.<sup>31</sup> For example, Blue J Legal can allegedly predict with 98% confidence, based on 20 questions, whether a person is classified as an employee or independent contractor under Canadian Law.<sup>32</sup> The data set contains all relevant case law from the early 1990s until 2016. The machine can analyse variables and construct relationships among them, rather than a human constructing these relationships:

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<sup>26</sup> Feedspot, 'Top 30 Legal Tech Blogs and Websites To Follow in 2018', <[https://blog.feedspot.com/legal\\_tech\\_blogs](https://blog.feedspot.com/legal_tech_blogs)>.

<sup>27</sup> Albert Yoon, above n 24, 467.

<sup>28</sup> Blazej Kuźniacki, 'The Artificial Intelligence Tax Treaty Assistant: Decoding the Principal Purpose Test' (2018) 72(9) *Bulletin for International Taxation* 524.

<sup>29</sup> *Ibid.*, 531-532; There are uses in other areas: ROSS Intelligence is used in bankruptcy law. Lex Machina uses prediction models for patent law. See: Big Law Business, 'Is Artificial Intelligence No Longer Cutting Edge?' <<https://biglawbusiness.com/is-artificial-intelligence-no-longer-cutting-edge>>; Lex Machina aims to predict how likely a judge will grant or deny a specific motion or how likely a judge is to find infringement of a patent, fair use of a trademark, etc., see Lex Machina, <<https://lexmachina.com/legal-analytics>>

<sup>30</sup> Benjamin Alarie, Anthony Niblett and Albert Yoon, above n 1, 8.

<sup>31</sup> Benjamin Alarie, Anthony Niblett and Albert Yoon, 'How Artificial Intelligence Will Affect the Practice of Law' (November 7, 2017), 8, <<https://ssrn.com/abstract=3066816>>.

<sup>32</sup> Benjamin Alarie, above n 10, 5.



*“Neural networks find hidden connections between the variables that we, as empirical modelers, do not specify and – probably – could not have identified even with unlimited time and resource using conventional approaches to legal research”<sup>33</sup>*

A probabilistic answer is provided, i.e. 20% chance that person A is an employee. A short opinion (approximately 2-4 paragraphs) outlines the reasoning behind the scoring and, most importantly, citing the relevant case law. Facts can be adjusted where they are disputed.<sup>34</sup> For example, person A’s employer disagrees about certain facts, and changes the answers to the questions, and obtains a separate probabilistic answer of 40%. The employer knows that even their version of facts indicates an employee status, thus, they avoid any dispute. It is argued that early settlements are more likely, saving money and time from lengthy disputes.<sup>35</sup>

Another obvious use is tax planning before a person is hired. The employer can carefully adjust the answers to reach a comfortable probabilistic answer. Whether this is 60% or 95% will depend on the risk appetite of the employer. This could provide the employer with a degree of certainty about the tax position of new employees.

Blue J Legal also collects user feedback and adjusts its algorithms accordingly based on collective input.<sup>36</sup> The basic premise is that average over a large dataset is reasonably accurate. There are also many other examples.<sup>37</sup> The implicit claim is that the AI tool can interpret and apply the law more effectively than a human. This is a serious claim and a fundamental challenge to humans in the tax profession providing this function. Part III critically analyses this claim by exploring the benefits

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<sup>33</sup> Ibid 10.

<sup>34</sup> Ibid 13.

<sup>35</sup> Ibid 21.

<sup>36</sup> Ibid 15.

<sup>37</sup> Ibid 16-17. For example, Residency classifier, Home office classifier, Tangible expenditure classifier, Intangible expenditure classifier, Real estate classifier, securities classifier and Taxable benefits classifier.

claimed by proponents. Part IV critically challenges these claims and exposes other issues regarding the use of AI.

### III. Opportunities

#### a. Legal certainty

The speed of change in any industry depends on the costs of legal uncertainty and how laws are calibrated.<sup>38</sup> The cost of non-compliance in tax law depends on the severity of the breach but can result in a prison sentence in most jurisdictions. Furthermore, the tax liabilities can be detrimental to any business. Hence, certainty is critical. Laws are often drafted broadly to capture potential tax planning, and notoriously complex that only a limited number of professionals understand them. One key argument for AI is increased legal certainty derived from the probabilistic answer. Many disputes between tax administrations and taxpayers debate what would happen in court with an adversarial nature. AI could create more objective predictions.<sup>39</sup> There are even bolder predictions from scholars in this area. Casey & Niblett envisage a world of “micro-directives” that use algorithms to automatically update laws.<sup>40</sup> Alarie predicts the achievement of “legal singularity” that effectively eliminates legal uncertainty where the law is updated in real time, allowing a shift from fewer standards to more rules.<sup>41</sup> Ex-post decisions will reduce and ex-ante guidance to individuals will increase in capability. Alarie also argues that ML could achieve an “efficient frontier” of public policy, extending beyond positive law.<sup>42</sup> The more immediate impact can be recognised today. Leaving aside the argument for “objective” prediction,<sup>43</sup> the argument for AI is based on one fundamental assumption: All stakeholders accept the use of AI as a credible objective predictor. Hence, it is

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<sup>38</sup> Anthony Casey and Anthony Niblett, above n 8, 436.

<sup>39</sup> See: Daniel Katz, ‘Quantitative Legal Prediction-or-How I Learned to Stop Worrying and Start Preparing for the Data-Driven Future of the Legal Services Industry’ (2013) 62 *Emory Law Journal* 909, 936.

<sup>40</sup> Anthony Casey & Anthony Niblett, above n 8, 436.

<sup>41</sup> Benjamin Alarie, above n 10, 3.

<sup>42</sup> *Ibid* 10.

<sup>43</sup> Analysed in Part IV.

necessary to analyse whether stakeholders would accept an AI tool as a predictor, irrespective of the validity of the underlying technology. The author analyses the perspective of MNEs, Big Four Firms and Tax Administrations. These three stakeholders represent the three prominent players in the tax profession.

### *Multinational Enterprises*

Multinational Enterprises ('MNEs') face the most complex tax issues given their cross-border activities. MNEs generally operate to maximize profits and reduce expenses (including tax expenses) and they are generally measured based on earnings per share ('EPS'). The Effective Tax Rate ('ETR') does play a factor in that equation. If the ETR is 30%, the EPS falls by 30%. If the ETR is 10%, the EPS falls only 10%. Thus, there is an inherent incentive to reduce the ETR. The activities of MNEs have been compared to Oliver Wendell Holmes' 'bad man' problem.<sup>44</sup> The 'bad man' is constantly searching for a lower ETR based on a calculated risk strategy that avoids detection and enforcement by tax authorities. There is research to suggest that use of a Big Four firm correlates with higher use of tax havens.<sup>45</sup> However, MNEs ETRs are often determined by their underlying business operations and other non-tax factors. While the use of ETR as a tool of performance in tax departments is prevalent, one needs to consider a broader perspective of a MNE. A MNE consists of many employees from diverse backgrounds. These employees are operating in wholly different areas of operations that require different sets of skills and experience. Like all employees, they act in their own interest and the goal of any board is to align the interests of the company with those of its

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<sup>44</sup> Bogenschneider, 'Manufactured Factual Indeterminacy and the globalisation of tax jurisprudence' (2015) 4(2) *UCL Journal of Law and Jurisprudence* 250; Oliver Wendell Holmes, 'The Path of the Law' (1897) 10 *Harvard Law Review* 457, 460-61: "[I]f we take the view of our friend the bad man we shall find that he does not care two straws for the axioms or deductions, but that he does want to know what the Massachusetts or English courts are likely to do in fact. I am much of his mind. The prophecies of what the courts will do in fact, and nothing more pretentious, are what I mean by the law."

<sup>45</sup> Chris Jones, Yama Temouri, Alex Cobham, 'Tax haven networks and the role of the Big 4 accountancy firms', 53(2) *Journal of World Business* 177 <<https://doi.org/10.1016/j.jwb.2017.10.004>>.

employees. The tax departments of MNEs are widely divergent, and each has differing degrees of influence on the overall decision making. Some MNEs operate more aggressive tax policies and use tax as a key value driver, while others may adopt a more passive approach and concentrate solely on compliance to tax law. The nature of the tax department will depend on a wide range of factors: influence on overall decision making, nature of industry, operating countries, parent country, employees within the tax department,

The head of the tax department, the Tax Director, is usually responsible to the board of directors about the overall ETR. Given the technical nature of tax, the board of directors have only a basic understanding of tax issues and rely heavily on the expertise of the tax department. The Tax Director is often incentivised to maintain or decrease ETR, but also to contain major tax risks. Tax Managers, employees who report to the tax Director, often act as middlemen between the Big Four Firms (Deloitte, PWC, EY and KPMG) and the Tax Director. Employees of MNEs are often on comfortable salaries with limited advancement opportunities and bonuses. Hence, there is an incentive to reduce their risk by relying on a Big Four Firm for opinions and other accountable action. The Big Four provide this service by essentially being blamed if adverse tax events occur. Furthermore, their liability is often almost non-existent in the service agreement with the MNE. Thus, employees of MNEs absolve their responsibility and accountability to the possible detriment of shareholders through high tax advisory fees. Prediction models could potentially offer an avenue for tax managers to use AI prediction tools to reduce their risks. MNEs could themselves adopt the technology where outsourcing to Big Four is more expensive. Some basic and common tax issues could be tackled using this technology (e.g. PEs).

AI technology is unlikely to be adopted by MNEs to interpret the law and make decisions for three main reasons. First, a global and systematic collection of data would first be necessary to substantially attract MNEs to use the technology. Second, MNEs often face unpredictable tax administrations from around the world where the law often plays second-fiddle to the practical

realities of international economic relations. Expecting that an AI tool could adjudicate the law is an extreme positivist position and ignores the reality of negotiation and international relations. Tax administrations often offer MNEs incentives to locate activities in their state through a raft of options, most notably special Transfer Pricing Deals. Third, accountability is a key need for MNE tax departments. Relying on software developers behind a AI tool is less accountable than a physical person representing a Big Four firm. A person can directly be blamed for any adverse tax results. The tax managers are risk and responsibility adverse. Therefore, it is unlikely that MNEs would adopt the AI technology to interpret the law and make decisions.

### *Big Four Firms*

Demand for lower costs from MNEs could incentivise Big Four to adopt the technology to increase market share. Instead of the costly and inefficient opinion, a Big Four could offer a simple prediction tool supervised by a consultant. The repetitive tasks of opinions for tax structures could be automated. Common and simple tax questions could also be answered by the prediction tool. There are, however, several hurdles. First, the current technology is still in early stages and certainly cannot answer complex tax questions involving MNEs. Simple questions such as whether person A is an employee or independent contractor would account for a fraction of the total role of a tax advisor. A tax advisor is often faced with several issues, legal and non-legal, which she must solve for the client. Second, AI technology has existed since the 1970s that have allegedly answered complex tax USA tax re-organisation issues. Despite the apparent availability of technology, there has been no uptake of technology. Thus, history suggests that AI will not be used. Third, the Big Four firm maintain a hegemony over MNEs. Whilst there is little scientific literature on the Big Four, their dominance is an important part of the tax market. Three key factors contribute to this dominance. First, not only tax services, the Big Four can provide other services such as Audit and Advisory, allowing them access to every aspect of a business. Often these services complement tax services and economies of scale are gained for a company by maintaining one firm. Their services are not

only restricted to private actors, governments regularly use the Big Four as rubber-stamps for decision making. Second, their global network of offices in nearly every country allow full services to MNEs. MNEs are very important for tax purposes as most cross-border business income is earned by corporations, rather than individuals.<sup>46</sup> MNEs often lack the tax expertise for their vast operations around the world, and the Big Four offer more cost-effective outsourcing. Third, the Big Four attract competitive young talent by offering potentially million-dollar salaries once they make partner. This creates a shortage of talent in other areas of tax. Employees often enjoy the technical aspect, but harbour deep resentments about time charging and time cost recovery targets.<sup>47</sup> Partners often have little incentive to keep employees as there are very limited equity partner positions available, and there is a limitless supply of young talent. Hence, a high-turnover rate is often tolerated. The dominance of the Big Four has important implications for stakeholders, and ultimately, there is no real incentive for Big Four firms to innovate and capitalise on AI even if they viewed AI as a credible source for answering tax issues. Furthermore, if their main clients, i.e. MNEs, would not accept AI tools, there is little incentive for them to adopt the technology.

#### *Tax administrations*

Tax administrations often struggle to enforce tax law due to a variety of factors. First, tax compliance is often voluntary. Hence, tax administrations rely on taxpayers self-reporting. Self-reporting is dependent on the tax morale of a country, which varies significantly between countries. Once this is completed, an audit will be conducted on a small percentage of taxpayers. This is somewhat equivalent to a lottery. Those who lose the lottery, i.e. audited, often face a lengthy period of scrutiny. Overall, tax administrations can only scrutinise taxpayers based on the information they receive. Hence, there is an information deficit.

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<sup>46</sup> R.S. Avi Yonah, *International Tax as International Law: An Analysis of the International Tax Regime*, (Cambridge University Press, 2007), 11.

<sup>47</sup> Poh Eng Hin, 'Career Plans and Work Satisfaction of Young Tax Professionals in the Big Four Public Accounting Firms' (2006) 12(5) *Asia-Pacific Tax Bulletin* 391.

Second, like any government department, the incentives to increase operational efficiency are less than the private sector as they face fewer competitive pressures. Third, tax administrations are often at the whim of their political masters whose masters often change in a free democratic society.

Agency capture, where interests distort decision-making is an ever-present risk.<sup>48</sup> Fourth, salaries are often lower than Big Four firms, thus, experts are often drawn to Big Four firms. Tax administrations are a great workplace for people seeking a comfortable and less stressful environment.

Consequently, technological uptake is often slow.

The New Zealand tax administration, Inland Revenue Department ('IRD'), one of the more tech-savvy tax administrations, is currently embracing AI and data analytics to improve general compliance through its Transformation program.<sup>49</sup> Brazil is also at the forefront of AI technology. Facial recognition technology is now commonplace for customs tracking individuals with luggage that are connected to a tax database, and systems are in place that track the importation of goods.<sup>50</sup> AI is used in tax assessments.<sup>51</sup> AI can adjudicate cases relating to tax debts lower than approximately EUR 4,500. Furthermore, The Supreme Court of Justice ('Supremo Tribunal Federal') actively uses AI, a machine called "Victor", to actively select analogous cases to a factual scenario. Thus, AI is already being used to interpret and apply the law by a court. The use of AI is seen as an antidote to the slow wheel of justice in Brazil.<sup>52</sup> However, it is too early to analyse the success of Brazil's use of AI to interpret and apply the law.

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<sup>48</sup> Thomas O. McGarity, 'Mtbe: A Precautionary Tale' (2004) 28 *Harvard Environmental Law Review* 281, 325.

<sup>49</sup> Inland Revenue, 'Transforming Inland Revenue', <<https://www.ird.govt.nz/transformation/transforming-ird.html>>

<sup>50</sup> 'SISAM' – Sistema de seleção aduaneira por aprendizado de máquina (Custom selection system by machine learning) uses AI to analyse imports.

<sup>51</sup> 'SPED' – Sistema Público de Escrituração Digital (Public System of Digital Accounting)

<sup>52</sup> Bloomberg, 'Brazil's mercurial courts undermine growth and democracy', <<https://www.bloomberg.com/opinion/articles/2018-07-15/brazil-s-mercurial-courts-undermine-growth-and-democracy>>

A “Sandbox”<sup>53</sup> approach could be used that allows a place where new products, ideas and concepts are tested.<sup>54</sup> Several public authorities are taking this approach to develop new ideas.<sup>55</sup> Tax administrations could learn from developments in FinTech to create areas for taxpayers. Common but difficult tax issues could also be tackled with AI. In New Zealand, there several rulings provided by the IRD relating to various factual questions.<sup>56</sup> The IRD could adopt AI technology to quickly answer common tax questions in the form of a tax ruling. A tax ruling could be provided within seconds, rather than months.<sup>57</sup> Alternatively, they could provide the technology free to users via their website. Something akin to Blue J Legal could be offered for users to answer common questions or queries. This could dramatically decrease enforcement costs for the IRD and enhance the tax morale of taxpayers. For example, persons unsure of their tax residency could go online and use an AI tool to assess their tax residency. The tool could be legally binding on the IRD if all information is correctly provided, hence, it would give all stakeholders certainty. Overall, tax administration could potentially improve information, increase administration capacity and enforcement powers, in addition to the argued benefits of legal certainty.<sup>58</sup> Thus, tax administrations could potentially apply AI to interpret and apply the law in specific cases.

## **b. Access to Tax Services**

Another key argument for AI is the increased access to tax services for people who could not otherwise afford to pay for tax services. One important aspect of professional services is information. Information about a local restaurant is easy to gather. However, information about a tax position can be complex. Basic questions are often understood such as general liability to tax for

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<sup>53</sup> Mark Fenwick, Wulf Kaal and Erik Vermeulen, ‘Regulation Tomorrow: What Happens When Technology is Faster than the Law?’ (2017) 6(3) *American University Business Law Review* 25.

<sup>54</sup> This occurs mainly in FinTech areas.

<sup>55</sup> Australian Securities and Investment Commission (‘ASIC’), Singapore’s Monetary Authority (‘MAS’) and Abu Dhabi’s Financial Services Regulatory Authority (‘FSRA’).

<sup>56</sup> Public Ruling, Private Ruling, Product Ruling and Status Ruling.

<sup>57</sup> Anthony Casey & Anthony Niblett, above n 8, 433.

<sup>58</sup> Benjamin Alarie, above n 10, 8.



wage-earners or business owners, however, increased complexity beyond a certain point requires a tax professional. Thus, access to tax information is access a trained tax professional. Tax professionals must complete a long road of hurdles before they are competent advisors, including: undergraduate (possibly postgraduate) degree(s), internships, professional examinations (Bar exams, CPA exams, etc.) and years of practical experience. Hence, access to tax professionals is restricted and often costly except for those who are owing tax refunds, where there are many online providers who offer services. Those with few resources cannot easily afford a tax professional. Therefore, there is an issue of lack of access to tax services.

Technological advances offer potentially greater access to tax information. There is a continuous “dramatic reduction in the cost of acquiring and using information”<sup>59</sup> across society as technology advances. There are lower costs of producing information, which lowers the costs of individuals to understand their legal rights and obligations.<sup>60</sup> The cost of real time updating of specific information is also reducing.<sup>61</sup> Some argue that there is broadly a general trend of increasing “democratization of the law”<sup>62</sup> due to advances in technology. Technological developments in law until recently have been based on automating rule-based tasks (discovering in litigation), while recent developments allegedly facilitate understanding and analysing legal materials, i.e. augmentation through AI.<sup>63</sup> The distinction is important. Automation completely removes the professional from the legal process. In a world of advanced automation, only complex and large scale legal tasks remain for the Big Four,

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<sup>59</sup> Anthony Casey & Anthony Niblett, above n 8, 431.

<sup>60</sup> Benjamin Alarie, Anthony Niblett and Albert Yoon, above n 3.

<sup>61</sup> Anthony Casey & Anthony Niblett, above n 8, 433.

<sup>62</sup> Benjamin Alarie, Anthony Niblett and Albert Yoon, above n 18, 3; Albert Yoon, above n 24, 456-471.

<sup>63</sup> Albert Yoon, above n 24, 466; See, Richard Susskind, *Expert Systems in Law: Jurisprudential Inquiry* (Oxford University Press, 1987).

hence small law firms suffer incalculably.<sup>64</sup> Small law firms have certainly suffered from automation, but studies in automation suggest lawyers are far safer than other professions.<sup>65</sup>

As mentioned, training a tax professional is lengthy and costly. The tax profession suffers from what is known as the “cost disease”.<sup>66</sup> The cost disease is where productivity of a particular employment is relatively constant, e.g. it takes performers in 2019 the same amount of time to perform Puccini’s *La Boheme* as in 1919. Computer technologies and providers such as LexiNexus or WestLaw have allowed a lawyer to search potential sources more effectively than hard copy sources. However, the lawyer must perform an accurate search and then read the source to determine their relevance.<sup>67</sup> This shift from analog to digital has some productivity gains, but it is hardly transformative.

Due to this “cost disease”, the number of hours worked by a tax professional still remains the common metric of evaluation, especially for lawyers.<sup>68</sup> Slower productivity gains in the tax sector increase the costs compared to other industries where technology provides greater productivity gains and lower costs for consumers. The result is high costs for individuals seeking tax services, hence reducing the access to tax services for lower and middle-income earners. However, AI offers small firms the ability to adopt technologies that reduce their cost and allows access to more clients who could not otherwise afford tax advice. Thus, there is arguably greater access to tax services. A software company could offer cheap access for tax advisors, who offer a lower cost service to lower and middle-income persons seeking tax advice. The pool of clients for tax advisors increase and more people have access to tax services. Hence, an overall increase in welfare would be achieved. The complete replacement of the tax professional is highly unlikely as AI still requires a trained

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<sup>64</sup> Albert Yoon, above n 24, 465.

<sup>65</sup> Carl Frey & Michael Osborne, ‘The Future of Employment: How Susceptible Are Jobs to Computerisation?’ (2017) 114 (Issue C) *Technological Forecasting & Social Change* 254 <[www.oxfordmartin.ox.ac.uk/downloads/academic/The\\_Future\\_of\\_Employment.pdf](http://www.oxfordmartin.ox.ac.uk/downloads/academic/The_Future_of_Employment.pdf)>

<sup>66</sup> William Baumol & William Bowen, ‘On the Performing Arts: The Anatomy of Their Economic Problems’ (1965) 55 *American Economic Review* 495.

<sup>67</sup> Albert Yoon, above n 24, 467.

<sup>68</sup> *Ibid* 460.

human to oversee the process and provide comfort and reassurance to the client. This shift from digital to computational legal information is seen as a natural progression in the age of computation.<sup>69</sup>

### *Summary*

Part II has revealed outlined the two main claims made by proponents of AI. First, AI provides a better prediction analysis than a human leading to increased legal certainty. The author argued that increased legal certainty is unlikely as MNEs and Big Four Firms are unlikely to adopt the technology, leaving only tax administrations to possibly adopt the technology. Second, AI could provide greater access to tax services. However, both claims assume that the underlying technology is credible. Part III critically challenges this assumption and argues that adoption of AI technology akin to Blue J Legal could pose a fundamental threat to the legal system if not properly managed.

## **IV. Challenges**

### **a. General scepticism of technology**

There is a general distrust of technology that must be acknowledged. There is a general scepticism of technology in every field including industries vastly affected by it such as the hotel industry (Airbnb), transport (Uber) and encyclopaedia (Wikipedia), etc.<sup>70</sup> Many people initially refused to ride elevators operated without a person.<sup>71</sup> Humans tend to overvalue their own expertise even in the face of superior technology. The professional services are no different. Lawyers have an inherent bias that overvalues their skills.<sup>72</sup> Perhaps the importance society has traditionally attached to the law firm

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<sup>69</sup> Alarie, Benjamin and Niblett, Anthony and Yoon, Albert, 'How Artificial Intelligence Will Affect the Practice of Law' (November 7, 2017), 7, <<https://ssrn.com/abstract=3066816>>.

<sup>70</sup> Benjamin Alarie, Anthony Niblett and Albert Yoon, above n 18, 2.

<sup>71</sup> Anthony Casey & Anthony Niblett, above n 8, 436.

<sup>72</sup> Jeffrey M Lipshaw, 'The Venn Diagram of Business Lawyering Judgments: Toward a Theory of Practical Metadisciplinarity' (2011) 41 *Seton Hall Law Review* 1; B.C. Brosnahn, 'The Law and Computers' (1970) 1(3) *Auckland University Law Review* 1, 3; Cass Sunstein, Kevin Ashley, Karl Branting & Howard Margolis, 'Legal Reasoning and Artificial Intelligence: How Computers "Think" Like Lawyers' (2001) 8 *University of Chicago Law School Roundtable* 1, 19.

has contributed to this bias. Another factor is that technology often creates unforeseen results<sup>73</sup>, whereas humans value predictability. Furthermore, humans are inherently social creatures, thus, we need human companionship. The internal combustion engine only disrupted the horse and carriage industry nearly 30 years after it was first developed by Karl Benz.<sup>74</sup> Despite the general scepticism of technology, a deeper analysis of AI in the interpretation and application of tax law reveals several challenges.

## **b. Data**

The most practical challenge to AI is the problem of data. Ultimately, the quality of your output depends on the quality of the input. Any tool providing probabilistic answers to specific tax problems requires data. For example, a question such as “Am I resident in State A?” requires a large set of data in the form of legally binding cases and/or other relevant data such as: tax rulings, publicly issued information from the tax administration and OECD/UN materials. As a result, the quality of the result is dependent on the quality of the data selected. Human judgment is necessary for less sophisticated models, i.e. they must make specific decisions and assumptions about the data.<sup>75</sup> The interaction effects between independent variables must be carefully considered. Ultimately it will depend on the people choosing these variables with each case they attempt to deconstruct except for deep neural networks. Anything less than a team of experienced professionals would lead to poor quality data that would impact the result.

More advanced models that use deep neural network algorithms, such as Blue J Legal, allegedly overcome most of these issues by autonomously constructing variables.<sup>76</sup> However, the problem of “over-fitting” can still occur where too many independent variables are provided.<sup>77</sup> Hence, the

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<sup>73</sup> Anthony Casey & Anthony Niblett, above n 8, 432.

<sup>74</sup> Henry Ford massed produced the Model T. See: Mark Fenwick, Wulf Kaal and Erik Vermeulen, above n 53.

<sup>75</sup> Benjamin Alarie, Anthony Niblett and Albert Yoon, above n 1, 6.

<sup>76</sup> Ibid 7.

<sup>77</sup> Ibid.

model is unable to detect the relevant variables in data that are “finely tuned to the idiosyncrasies or biases in the training set such that they are not predictive of future, novel scenarios”.<sup>78</sup> This may be particularly relevant where tax planning structures evolve to ever changing rules. Where a future case involves new features, the data is less valuable in predicting the outcome. Another important limitation is the lack of data. Tax Laws are often complex and certain areas lack a useful amount of data to provide any reliable prediction such as anti-avoidance rules<sup>79</sup>. Hence, an AI tool has limited scope.

### **c. Pandora’s box**

The AI tool could also open Pandora’s box. The model may construct hidden variables in data that undermine the legal system based on non-legal factors that tax professionals use in their predictions such as the relevant court of judge.<sup>80</sup> The very faith in the rule of law is based on adjudication to the law, rather than non-law factors. Legal realism has revealed the folly of positivism to a certain extent, but AI takes an extreme positivist position by essentially implying that law can be constructed via machine algorithms.

The results could potentially entrench biases in the law against certain groups or individuals in society.<sup>81</sup> The tool also largely ignores the wider context of how tax rules are formulated, which is characterised by risks of non-transparency, administrative abuses of power and corruption.<sup>82</sup>

Furthermore, tax law is not only the written rules, but includes also the enforcement of those rules.<sup>83</sup> Research has indicated that the Inland Revenue Service’s targeted practice of auditing lower

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<sup>78</sup> Harry Surden, above n 7, 106.

<sup>79</sup> *Ibid.*

<sup>80</sup> Daniel Katz, Michael Bommarito and Josh Blackman, above n 25. There was a strong correlation between the circuit of origin and the outcome of the case.

<sup>81</sup> Anthony Casey & Anthony Niblett, above n 8, 432; Harry Surden, above n 7, 106.

<sup>82</sup> Miranda Stewart, ‘Abuse and Economic Substance in a Digital BEPS World’, 69(6/7) *Bulletin For International Taxation* 6/7 (2015), 399, 407.

<sup>83</sup> Bret Bogenschneider, ‘Manufactured Factual Indeterminacy and the globalisation of tax jurisprudence’ (2015) 4(2) *UCL Journal of Law and Jurisprudence* 250.

and middle class individuals in the United States has led to a regressive tax system in the United States.<sup>84</sup> The Inland Revenue Service is using technology to specifically target the cash economy in New Zealand.<sup>85</sup> Given the potential benefits of using AI technology, there is always a risk of certain groups (private or public) utilising the technology to further enhance their own interests at the expense of general overall welfare. There could be a legal arms race between governments and private actors optimizing machines<sup>86</sup>, to the detriment of certain groups or individuals unable to adopt the technology.

For example, an AI tool could be developed specifically to design tax planning structures that are not designated “tax avoidance” under a country’s tax laws. As mentioned, Kuźniacki even developed a tool to analyse the OECD PPT.<sup>87</sup> This could allow a tax advisor, through several iterations, to carefully design tax structures that are legally fall outside of the PPT. Hence, it would take the current tax planning and effectively inject steroids. The ETR of companies, individuals, trusts, etc. would be determined by the quality of their AI software. Such an outlook would only exasperate income and capital inequality.

There are also problems of privacy as machines will collect data about humans.<sup>88</sup> How that information is stored and/or used could create several issues. The accuracy of AI increases with more data, hence there is an entrenched incentive for accumulating data. Outside the scope of the article, but fundamentally, human autonomy is also diminished,<sup>89</sup> which creates potential dilemmas for philosophers.

#### **d. Role of Judiciary**

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<sup>84</sup> Bret Bogenschneider, ‘Income Inequality and Regressive Taxation in the United States’ (2015) 4(3) *Interdisciplinary Journal of Economics and Business Law*, 8.

<sup>85</sup> Inland Revenue, ‘If you reckon cash jobs don’t leave a trail, think again’, <<https://media.ird.govt.nz/articles/three-ways-undeclared-cash-jobs-can-leave-a-trail/>>

<sup>86</sup> Benjamin Alarie, above n 10, 8.

<sup>87</sup> Blazej Kuźniacki, above n 28.

<sup>88</sup> Anthony Casey & Anthony Niblett, above n 8, 438.

<sup>89</sup> *Ibid.*

One alleged benefit of AI is the reduction in cost. Sustaining a justice system is costly, and governments, depending on their effectiveness, are limited in their attempt to provide justice to stakeholders. Thus, an AI tool could enhance overall welfare by reducing disputes. However, we must think critically about the consequences of use of AI in the interpretation and application of law.

The biggest challenge of AI is that it poses an obvious threat to the legal system. Open liberal democracies are based on the Montesquieu's separation of powers: legislative, executive and judicial. The judicial branch interprets and applies the law independently from the legislative and executive branches. If a sophisticated model using deep neural networks is adopted by stakeholders and recognised as authoritative, the role of the judiciary is essentially extinguished, which is only sparsely recognised by proponents of AI as the "reduced role" of the judiciary.<sup>90</sup> Instead of a judge deciding a dispute in a court, it would be an AI tool owned by private actors. This scenario should frighten readers for several reasons.

First, the central function of the judiciary is the "paramount and continuing duty to uphold the law".<sup>91</sup> Judges are selected in jurisdictions based primarily on their experience and expertise.<sup>92</sup> It is usually the best lawyers who become a Judge and the prestige is high. The judges in the highest courts (e.g. Supreme Court of the United States of America) around the world guarantee the rights of citizens under the written or unwritten (in the case of New Zealand) Constitution. The role is fundamental to any society and held as sacred. Inherent in this role, is the check on executive and legislative branches that attempt to increase or overstep their power and exert tyrannical authority over individuals or groups. The judiciary protects people from this tempting power by upholding the law. Any citizen can apply to a court to enforce the law and guarantee their rights. This process is

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<sup>90</sup> Ibid 437.

<sup>91</sup> Frank M. Jr. Johnson, 'The Role of the Judiciary with Respect to the Other Branches of Government' (1977) 11 *Georgia Law Review* 455, 476.

<sup>92</sup> In New Zealand, Judges are only required to have a practising certificate as a barrister or solicitor for at least seven years (Section 94 of the Senior Courts Act 2016).

well-known to every citizen who may feel aggrieved about a situation. A citizen can instruct a lawyer to act on their behalf and pursue their “day in court” if the circumstances warrant such an action.

Second, the judicial system has a highly evolved ethical component where lawyers and judges uphold certain values and duties that ensure a coherent application of the law, and fundamental confidence in the judicial system. A coherent judicial system did not come from nothing, it was a result of a long-fought struggle of mankind to escape the tyrannical rule of Kings and Dictators.<sup>93</sup> An appeal system is universal in most jurisdictions, i.e. a party can appeal to a higher court. The fundamental point is that our judicial system is a highly evolved coherent check on power that is transparent.

These two reasons outlined are fundamental to our legal system. Let us now assume that an AI tool is universally accepted by stakeholders (governments, tax advisors, judiciary, tax administrations and taxpayers). A group of 21<sup>st</sup> century Einstein’s have solved all data problems with more advanced neural networks that can construct variables beyond our own imaginations. The taxpayer simply enters their factual situation into the system, and the AI tool informs the taxpayer of the result, simultaneously informing the tax administration and applying the “law immediately”. The check on power and the current role of the judiciary would be transferred from a set of Judges to these 21<sup>st</sup> century Einsteins and the software developers who oversee the functioning of the tool. These software developers have their own private vested interests. Is it reasonable to place the role of guarantor of rights and check on power to software developers? The answer is clearly no. There is no developed system to ensure this role is fulfilled. It is more likely that commercial realities will drive the interests of software developers, leading to a breakdown in the legal system.

The greatest problem is the lack of transparency. Is it reasonable to adjudicate a legal dispute with Deep neural networks? Deep neural networks construct variables in a manner unknown to the human programmer. It allegedly surpasses human cognition by developing the most relevant

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<sup>93</sup> For example: Magna Carta (1215), Bill of Rights (1689), Human Rights Act (1988)



variables. Hence, the system is essentially non-transparent. How could a person appeal against an AI tool where they are unaware of how the result was achieved? And if the AI tool was accepted as authoritative, what is there to appeal? The system of appeal would be meaningless. Two key consequences would arise. First, legal certainty would be severely undermined as nobody could ascertain the exact construction of variables. Second, access to software would be likely maintained by a small number of people able to exploit the technology. Hence, lower and middle-income earners would likely have little access to the technology. Furthermore, the technology could even be used to further perpetuate inequalities in society. Therefore, the alleged claim of increased legal certainty and access to tax services is on shaky ground. Overall, we cannot undermine the judicial system by handing control over to software developers and a AI tool that we cannot understand how it functions.

### *Summary*

The criticisms aimed at AI are serious. First, the underlying data must be carefully considered. Simply assuming quality data is foolish. Second, any AI tool could further entrench the biases that already exist in our legal system. Third, the reduced role of the judiciary and shift of power to the software owners has serious consequences for legal systems that cannot be ignored.

## **V. Conclusion**

The article has argued against the use of AI for the purposes of interpreting and applying tax law. The alleged advantages of AI, namely legal certainty and access to tax services, are highly questionable. However, a “sandbox approach” to certain tax issues (e.g. tax residency) that is limited to website use could provide increased certainty for stakeholders and wider access to tax information. However, the article argues that the underlying problems with data and the threat to judicial systems render AI a danger to the tax profession that would open Pandora’s box. Hence, any adoption of the technology must proceed carefully. The hype surrounding AI should not cloud the

judgment of decision-makers. Dealing with new technology is a perilous task. Distinguishing between hype and ground-breaking developments is challenging. One author notes:

*“Some facts may be difficult to empirically establish or contested, even among experts in that field. The task of establishing facts about new technology may be made difficult by the lack of an adequate sample or other reliable data on the effects of new technology”*<sup>94</sup>

Hence, regulators are weary of making decisions based on little information and where risks are high. The inevitable result is that success is the avoidance of catastrophe that is categorised as the Strong Precautionary Principle.<sup>95</sup> The author suggests such a precautionary approach is warranted that applies extreme caution to the use of AI technologies and adopts strategies that recognises the inherent dangers. This approach must be driven by tax administrations in cooperation with governments who are careful to protect tax systems from increased use of AI for interpreting and applying tax law. Decision-makers need to accept contingency and openness to novel challenges. The speed of change in our world is accelerating beyond anything imaginable only centuries ago, and central authorities must keep up with the threat they pose to legal systems.

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<sup>94</sup> Mark Fenwick, Wulf Kaal and Erik Vermeulen, above n 53.

<sup>95</sup> Noah M. Sachs, ‘Rescuing the Strong Precautionary Principle from Its Critics’ [2011] *University of Illinois Law Review* 1285, 1298.