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Timeless principles of taxpayer protection: how they adapt to digital disruption

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Abstract

Digital transformation will pose growing challenges to tax revenues and systems of taxation that were designed for another century. The tax rules may hasten slowly, but the record of response to the challenges of electronic commerce, and of base erosion and profit shifting, shows that tax administration is more adaptable. This article identifies the detailed nature of technological changes in electronics and systems; big data, automation and artificial intelligence; and security, including blockchain; as those changes affect tax administration. It highlights the critical taxpayer rights issues and applies accepted taxpayer rights frameworks. The article concludes that taxpayer rights principles are both highly adaptable to a digital world, and provide useful guidance to where urgent action and further research are required.

Key words: taxpayer rights; digital transformation; artificial intelligence; automation; blockchain; security; tax administration; compliance; government; Australian Taxation Office

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1.   INTRODUCTION

This article analyses the impact of digitalisation on the tax administration, with a focus on taxpayer rights and obligations. Tax administrators face fundamental questions. How they respond will dictate the level of trust in the tax system. What are the areas of digitalisation that will most impact on tax administration? How might these affect taxpayer rights and do current principles provide enough protection? Are there areas of significant concern which need urgent research to shape the direction of tax administration in a digital world?

The article first defines the problem of uncertainty in the face of technological change, particularly given the potential impact on tax revenue. Section 3 illustrates from the history of the treatment of electronic commerce and base erosion and profit shifting (BEPS), that any response to change is likely to be driven through an adaptable tax administration rather than by any changes to the tax rules.

Section 4 explores the issues facing revenue authorities as they prepare to administer a tax system in a rapidly changing society and identifies the three areas of technology most immediately relevant to taxation administration and compliance. It analyses in detail the nature and impact of these three main areas of technological development likely to affect tax administration and associated taxpayer rights: electronics and systems; big data, automation and artificial intelligence; and security and blockchain.

Section 5 considers, in the light of the issues raised, whether the current taxpayer rights principles are sufficient, using the Australian context. It uses an accepted rights framework to analyse the application of taxpayer rights principles to areas where advances in technology are of identified concern. The article concludes that while the principles themselves remain appropriate and are sufficiently adaptable to cater to rapid change, there is a deficit of research into, and analysis of, how they should apply to changing technologies.

2.   THE PROBLEM

A 2017 McKinsey Report[1] providing the results of a major global study on government productivity, articulated the problem that government spending on core public services such as education, health care and transport is increasing in response to growing public expectation and demand.[2] This combines with the challenges of providing for an ageing population, growing youth unemployment in many countries and economic inequality.[3] This suggests that revenue will need to grow to meet spending demands.

Digital transformation of the global economy is forecast to have a profound effect on labour markets and automation.[4] Forecasters have come up with a range of potential

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[1] McKinsey and Company, *Government Productivity: Unlocking the $3.5 Trillion Opportunity*, McKinsey Center for Government Discussion Paper (April 2017), available at:
https://www.mckinsey.com/industries/public-sector/our-insights/the-opportunity-in-government-productivity.
[2] Ibid ch 1.
[3] Ibid ch 2.
[4] McKinsey and Company, *Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation*, McKinsey Global Institute report (December 2017), available at: https://www.mckinsey.com/featured-insights/future-of-work/jobs-lost-jobs-gained-what-the-future-of-work-will-mean-for-jobs-skills-and-

scenarios for the automation of work.[5] Extreme forecasts feed doomsayers in the popular press.[6] In response, the Organisation for Economic Co-operation and Development (OECD) and others have undertaken substantial work applying academic theories from a range of disciplines to construct models to guide government policy-making.[7] The challenge is how to skill, upskill and reskill the labour market on an ongoing basis in the face of what has been popularly termed the Fourth Industrial Revolution.[8] The trajectory of tax revenue growth is therefore highly uncertain.

The OECD reports propose likely scenarios and appropriate government policies using theories that draw together the work of disciplines such as labour economics, economic history, education, and social psychology.[9] In each of these scenarios, the reshaping of the economy, society and the role of government will have profound implications for taxation and its administration.

The more detailed research demonstrates that the challenge to government is far more complex than the popular scenarios suggest and will require significant interventions across the economy.[10] Although consulting groups put forward opportunities for significant government savings,[11] and these are explored further below, the analysis of revenue and expenditure has yet to draw all these elements together.

This is a critical gap. Government economic forecasts, normally presented in annual budgets with periodic updates, provide a detailed analysis of economic projections, including tax revenue growth. These forecasts are bound by the rules for budget

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wages; Organisation for Economic Co-operation and Development (OECD), *The Next Production Revolution: Implications for Governments and Business* (OECD Publishing, 2017) 28.

[5] For example, McKinsey and Company, *Jobs Lost, Jobs Gained*, above n 4; AlphaBeta, *The New Work Order* (Foundation for Young Australians, 2017), available at: https://www.fya.org.au/report/new-work-order/; Carl Benedikt Frey et al, *Technology at Work v2.0: The Future Is Not What It Used To Be*, Oxford Martin School and Citi Global Perspectives and Solutions report (Citigroup, 2016), available at: https://www.oxfordmartin.ox.ac.uk/downloads/reports/Citi_GPS_Technology_Work_2.pdf.

[6] For example, Robert Gottliebsen, 'Technology to Eliminate Half of World's Four Billion Jobs in a Decade or Two' *The Australian Business Review* (22 May 2017); Arwa Mahdawi, 'What Jobs Will Still Be Around in 20 Years? Read This to Prepare Your Future' *The Guardian* (26 June 2017), available at: https://www.theguardian.com/us-news/2017/jun/26/jobs-future-automation-robots-skills-creative-health (accessed 21 January 2019).

[7] See OECD, *Getting Skills Right: Skills for Job Indicators* (OECD Publishing, 2017) 13; OECD, *Getting Skills Right: Good Practice in Adapting to Changing Skill Needs, A Perspective on France, Italy, Spain, South Africa and the United Kingdom* (OECD Publishing, 2017) 12; World Economic Forum and Boston Consulting Group, *Towards a Reskilling Revolution: A Future of Jobs for All* (World Economic Forum, 2018), available at:
https://www.weforum.org/reports/towards-a-reskilling-revolution.

[8] OECD, *Skills for Job Indicators*, above n 7; OECD, *Good Practice in Adapting to Changing Skill Needs*, above n 7; World Economic Forum and Boston Consulting Group, above n 7; and see Carl Benedikt Frey and Michael A Osborne, 'The Future of Employment: How Susceptible Are Jobs to Computerisation?' (Working Paper, Oxford Martin School, 2013).

[9] OECD, *Getting Skills Right: Assessing and Anticipating Changing Skill Needs* (OECD Publishing, 2016) and OECD, *Skills for Job Indicators*, above n 7.

[10] OECD, *Assessing and Anticipating Changing Skill Needs*, above n 9; OECD, *Skills for Job Indicators*, above n 7; Productivity Commission, *Shifting The Dial: 5 Year Productivity Review*, Inquiry Report No 84 (3 August 2017) 33, available at:
https://www.pc.gov.au/inquiries/completed/productivity-review/report/productivity-review.pdf.

[11] For example, McKinsey and Company, *Government Productivity*, above n 1.

preparation.[12] The long-term *2015 Intergenerational Report: Australia in 2055*[13] assumes a long run constant tax-to-GDP ratio.[14] While it highlights 'overwhelmingly positive economic developments',[15] it is cautious on the quantum of beneficial impacts.[16] International Monetary Fund (IMF) Global and Country Outlooks, while they include predicted benefits from significant capital investments to improved government operations, take a prudent view of the fiscal effect of potential productivity or fiscal improvements from digital or workforce transformation.[17]

Linear forecasts and projections are necessarily based on assumptions derived from the known, that is historical datasets and complex economic and econometric models.[18] While the data and algorithms are generally weighted to reflect immediate history, that is prior quarters and years, they are essentially based on lag data and known facts, adjusted for a risk-based assessment of future events using endogenous and exogenous variables. Qualitative or technological forecasting can ameliorate this but only to a limited degree. Furthermore, we struggle to incorporate effectively Black Swan events[19] into macroeconomic forecasting.

Added to this uncertainty, incremental trends are often not fully incorporated into assumptions if they deviate substantially from the norm. For example, the move to disaggregated, cross-jurisdictional business models that increasingly depend on contract labour is not fully incorporated into macroeconomic models of tax revenue collection, simply because it is uncertain how quickly and broadly this will affect an economy.[20]

There are many similar trends, which are partly known, but their impact is largely unknown, or the impact is not yet included in budget forecasts.[21] The 'unknown' includes the scope and extent of the disruption that might flow from the trend, assuming the guess as to its direction is accurate. Surely this has always been an issue and governments will continue to respond as required with appropriate adjustments to policy and regulation?

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[12] The *Charter of Budget Honesty Act 1998* (Cth) requires a budget economic and fiscal outlook report, including a statement of the risks that may have a material effect on the fiscal outlook. The Australian Commonwealth Budget process is described at: www.finance.gov.au.

[13] Australian Government, *2015 Intergenerational Report: Australia in 2055* (March 2015), available at: https://static.treasury.gov.au/uploads/sites/1/2017/06/2015_IGR.pdf, and released every five years under Part 6, *Charter of Budget Honesty Act 1998* (Cth).

[14] Ibid 79.

[15] Ibid 90.

[16] Ibid 92 and see 'Aggregate fiscal projections', 110.

[17] International Monetary Fund (IMF), *World Economic Outlook October 2017, Seeking Sustainable Growth: Short-Term Recovery, Long-Term Challenges* (2017) 'Statistical Appendix', 217, www.elibrary.imf.org.

[18] For example, see Australian Government, *2015 Intergenerational Report*, above n 13, where the trends identified throughout the report are difficult to reflect in the forecast scenarios: Appendix C Methodology, 106. See further, Angus Moore, 'Measuring Economic Uncertainty and Its Effects' Reserve Bank of Australia Research Discussion Paper RDP2016-01, February 2016), available at: https://www.rba.gov.au/publications/rdp/2016/2016-01/.

[19] Nassim N Taleb, *The Black Swan: The Impact of the Highly Improbable* (Random House, 2nd ed, 2010) xxii: a Black Swan event is an outlier event outside the realm of regular expectations, carries extreme impact and is only 'explainable' after the fact.

[20] See, for example, Australian Government, *2015 Intergenerational Report Australia in 2055*, above n 13.

[21] See IMF analysis of weather shocks on economic activity: *World Economic Outlook October 2017*, above n 17, ch 3.

If recent history continues, the pace of change is accelerating, driven by the pace of innovation and invention.[22] The popular concept of the Fourth Industrial Revolution highlights the fundamental changes in technology that will drive the way society works.[23] It also embraces the acceleration of fundamental change. Pivotal inventions of the last industrial revolution, such as electricity, motor vehicles, aeroplanes, telephone, and the machine gun took decades to transform the world and labour markets in the first part of the 20th century.[24] Digital technologies are doing so faster and more comprehensively.[25]

What this means is:

6. Society is changing faster than at any time in history;

7. Economic forecasts suggest that the economy and labour markets will change equally rapidly;

8. Current economic modelling does not and cannot take account of the change at this pace; and

9. Key components of government forecasts, including labour markets, business activity, taxation and compliance are premised on assumptions that often no longer hold.

Government will have to change, and regulation will have to change, in response to changes in society, simply to ensure that there is continuing stability and the expectations of citizens are met.[26]

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[22] McKinsey and Company, *Jobs Lost, Jobs Gained*, above n 4.

[23] See Klaus Schwab, 'The Fourth Industrial Revolution: What It Means, How To Respond' *World Economic Forum* (16 January 2016), available at: https://www.weforum.org/agenda/2016/01/the-fourth-industrial-revolution-what-it-means-and-how-to-respond (accessed 21 January 2019); and on the effects: OECD, 'Future of Work and Skills' (Paper presented at the 2nd Meeting of the G20 Employment Working Group, Hamburg, 15-17 February 2017) 8, http://www.oecd.org/els/emp/wcms_556984.pdf. However, there are differing perspectives: for example, Michael E Porter, *The Competitive Advantage of Nations* (Free Press, 1990) attributes change in large part to the competitive development of national economies, whereas Daron Acemoglu and James A Robinson, *Why Nations Fail: The Origins of Power, Prosperity, and Poverty* (Crown Publishing, 2012), emphasise the importance of institutions.

[24] See, for example, Gene M Grossman and Elhanan Helpman, *Innovation and Growth in the Global Economy* (MIT Press, 1991); Alfred L Norman, *Informational Society: An economic theory of Discovery, Invention and Innovation* (Kluwer, 1993).

[25] See the discussion in Claudia Loebbecke and Arnold Picot, 'Reflections on Societal and Business Model Transformation Arising from Digitization and Big Data Analytics: A Research Agenda' (2015) 24(3) *Journal of Strategic Information Systems* 149; Schwab, above n 23.

[26] Loebbecke and Picot, above n 25; Schwab, above n 23. As an example of seemingly unconnected events that impact on society, the Arab Spring Revolution is argued to have occurred in part because of the combination of climate change, where an unprecedented widespread drought caused mass movement to cities in search of food, and the proliferation of mobile technologies and social media. See Sarah Johnstone and Jeffrey Mazo, 'Global Warming and the Arab Spring' (2011) 53(2) *Survival* 11. See further, on the broader governmental responses to digital transformation: OECD, 'Ministerial Declaration on the Digital Economy: Innovation, Growth and Social Prosperity' (Cancún Declaration) (22-23 June 2016), https://www.oecd.org/internet/Digital-Economy-Ministerial-Declaration-2016.pdf; OECD, *Key Issues for Digital Transformation in the G20*, Report prepared for a Joint G20 German Presidency/OECD Conference, Berlin, 12 January 2017 (OECD Publishing, 2017), http://www.oecd.org/g20/key-issues-for-digital-transformation-in-the-g20.pdf.

The point is that digital transformation has broader ramifications for society and government than are currently included in government planning. This article focuses on their impact on one broad aspect of taxation: taxation administration and compliance. However, neither the impact of change nor the solutions to the challenges it raises can be limited to one sphere of society. The conclusions and recommendations below are therefore inextricably interdependent and will need careful adjustment in the context of other areas of government and changes and challenges not yet conceived. However, as taxation is one of the last bastions of national sovereignty[27] it may be, unwillingly, one of the areas most impacted by a world that operates differently at every level from the way it did in the 20th century.

3.   TAXATION AND THE RESPONSE TO CHANGE

In broad terms how have governments responded to the challenges to taxation raised by developments in technology? Is it a model that we can adopt that is well-placed to assure continuing stability and meet the expectations of citizens? This section reviews the response to the development of electronic commerce, new technologies and associated business models.

The development of electronic commerce was not the first occasion where governments took a collective approach to respond to unforeseen changes to events presenting a taxation challenge. Frameworks developed in the 20th century included an advanced network of double tax agreements, agreements to exchange information, and broad acceptance of the structure of taxation applicable globally,[28] albeit often with highly individual variations. Various international organisations acted to coordinate responses both global and regional.[29] By extending engagement beyond its members to include influential developing economies, the OECD has taken a lead role in fiscal responses to structural issues.

It is important to note that a review of harmful tax competition, the precursor to the work on BEPS, immediately preceded work on electronic commerce, in the same way that work on BEPS has preceded consideration of the digital economy. The OECD produced its Report, *Harmful Tax Competition: An Emerging Global Issue*, in 1998

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[27] For a comprehensive analysis, see Duncan Bentley, *Taxpayers' Rights: Theory, Origin and Implementation* (Kluwer Law International, 2007) 40. As examples, see regarding the General Agreement on Tariffs and Trade, Alvin C Warren Jr, 'Income Tax Discrimination against International Commerce' (2001) 54(2) *Tax Law Review* 131; and regarding the European Convention on Human Rights, see Protocol to the *Convention for the Protection of Human Rights and Fundamental Freedoms* (as amended by Protocols 11 and 14) opened for signature 4 November 1950 (entered into force 3 September 1953) art 1, http://www.echr.coe.int/Documents/Convention_ENG.pdf.

[28] For a historical analysis, see, for example, Sol Picciotto, *International Business Taxation: A Study in the Internationalization of Business Regulation* (Weidenfeld and Nicolson, 1992); Ken Messere, Flip de Kam and Christopher Heady, *Tax Policy: Theory and Practice in OECD Countries* (Oxford University Press, 2003); John Tiley (ed), *Studies in the History of Tax Law* (Hart Publishing, 2004); Victor Thuronyi (ed), *Comparative Tax Law* (Kluwer Law International, 2003). It can be argued that the frameworks were a direct result of imperialism, colonialism, and entrenched power structures. However, they developed a level of standardisation, which made subsequent cooperation feasible: see the analysis in Bentley, *Taxpayers' Rights*, above n 27, Ch 2.

[29] This was formalised in April 2016, with the launch of the Platform for Collaboration on Tax by the IMF, OECD, United Nations and the World Bank Group; see OECD, 'Platform for Collaboration on Tax', http://www.oecd.org/ctp/platform-for-collaboration-on-tax.htm. The First Global Conference of the Platform for Collaboration on Tax – Taxation and the Sustainable Development Goals was held at the UN Headquarters in New York, 14-16 February 2018.

after two years' work,[30] following a series of pre-emptive measures by the European Union among other jurisdictions.[31]

It was therefore in this context that the OECD considered the emergence of electronic commerce. The OECD responded to pressure from influential members to reach a common position, given concern that individual responses could undermine tax neutrality.[32] There had been some fear that taxpayers would circumvent traditional tax systems to the detriment of traditional revenue collection.[33] The 1998 OECD Ministerial Conference in Ottawa agreed a broad framework of key taxation principles: 'A Borderless World - Realising the Potential of Electronic Commerce' (Ottawa Framework).[34] Importantly, the Ottawa Framework acknowledged that new technologies could improve tax administration and service standards, and reduce compliance costs.[35]

The OECD was aware that to achieve alignment in reform of tax frameworks, rules and systems, meant it had to engage key stakeholders.[36] The OECD therefore coordinated a more inclusive consultation, engaging countries outside the traditional OECD power grouping, and a wide range of stakeholders.[37] It formed Technical Advisory Groups (TAGs) in January 1999 to provide initial advice on the implications of electronic commerce for tax systems and administration of technology, professional data assessment, consumption taxes, and business profits.[38]

The work of these groups and other collaborative forums built on the OECD's existing models for cooperation and provided the genesis for the broad degree of engagement at

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[30] OECD, *Harmful Tax Competition: An Emerging Global Issue* (OECD Publishing, 1998), https://www.oecd.org/tax/transparency/about-the-global-forum/publications/harmful-tax-competition-emerging-global-issue.pdf.

[31] Council of the European Union, Conclusions of the ECOFIN Council Meeting on 1 December 1997 Concerning Taxation Policy, 1998 OJ (C2) 1, discussed in Edward Troup and Paul Hale, 'EU Initiatives on Tax Harmonization: Do As I Say, Not As I Do?' (1998) 17 *Tax Notes International* 1081.

[32] This was the position of the US in particular, which moved quickly to introduce its *Internet Tax Freedom Act*, included as Titles XI and XII of the *Omnibus Appropriations Act of 1998*, discussed in Timothy Fallaw, 'The Internet Tax Freedom Act: Necessary Protection or Deferral of the Problem?' (1999) 7(1) *Journal of Intellectual Property Law* 161.

[33] Duncan Bentley, 'The ATO, Tax and the Internet: The Emperor's New Clothes?' (analysis of ATO, *Tax and the Internet: Second Report – December 1999*) (1999) 9 *Revenue Law Journal* 99.

[34] Committee on Fiscal Affairs, *Electronic Commerce: Taxation Framework Conditions*, report presented to Ministers at the OECD Ministerial Conference, 'A Borderless World: Realising the Potential of Electronic Commerce, Ottawa, 8 October 1998 (Ottawa Framework), https://www.oecd.org/ctp/consumption/1923256.pdf.

[35] Ibid para 8.

[36] For an analysis of the importance of engagement, see Kathryn James, 'An Examination of Convergence and Resistance in Global Tax Reform Trends' (2010) 11(2) *Theoretical Inquiries in Law* 475; Clinton Alley, Duncan Bentley and Simon James, 'Politics and Tax Reform: A Comparative Analysis of the Implementation of a Broad-Based Consumption Tax in New Zealand, Australia and the United Kingdom' (2014) 24 *Revenue Law Journal* 1; Alan Fenna, 'Governing in Good Times: Fiscal Policy and Tax Reform in Australia 1996-2006' (2007) 42(2) *Australian Journal of Political Science* 329.

[37] See Bentley, 'The ATO, Tax and the Internet', above n 33, 108. The structure of the TAGS is set out in OECD, *Taxation and Electronic Commerce – Implementing the Ottawa Taxation Framework Conditions* (OECD Publishing, 2001); and the outputs of the TAGs at OECD, 'Taxation Aspects of Electronic Commerce: Publication of Reports and Technical Papers', http://www.oecd.org/tax/treaties/ecommercereportsandtechnicalpapers.htm.

[38] OECD, *Taxation and Electronic Commerce*, above n 37; OECD, 'Taxation Aspects of Electronic Commerce', above n 37.

multiple levels evident today.[39] For direct and indirect tax rules, the Business Profits and Consumption Tax TAGs were largely concerned with how to make existing rules, particularly treaty rules, work more effectively in the context of electronic commerce.[40] Their mandate was not to focus on whether the tax regulatory framework was appropriate.[41] Indeed, their purpose was consistent with the Ottawa Framework that '[t]he taxation principles that guide governments in relation to conventional commerce should also guide them in relation to electronic commerce'.[42]

There were useful outputs, such as the clarification on the application of the permanent establishment definition to electronic commerce, which resulted in changes to the Commentary on the OECD's Model Tax Convention on Article 5.[43] However, the TAGs provided much wider-ranging guidance on tax administration and compliance covering areas from verification of customer status and jurisdiction to maintaining the integrity and authenticity of electronic records over time.[44] This was consistent with the Ottawa Framework principle authorising 'new administrative or legislative measures, or changes to existing measures' designed to improve the application of existing taxation principles without discrimination.[45] The latter precluded implementation of proposals such as a tax-free environment for e-commerce or, at the other extreme, special e-commerce taxes such as a Bit tax.[46]

As noted by the OECD in its 2003 Report on the implementation of the 1998 Ottawa Framework, popular forecasts were often over-optimistic and heralded an era that was not delivered in the time or way suggested.[47] The conservative reaction inherent in policy-making[48] was reinforced by the dot.com bubble and crash in the early years of the 21st century.[49] Discussion involving multiple parties and jurisdictions reflected the different interest groups and the tax policy responses necessarily constituted a compromise. This can be seen in the resolution to many proposed solutions posed in response to the growth of the internet and electronic commerce. The basic tax rules therefore remained largely unaffected by the changes to business models.

Commenting on the tax challenges of digitalisation in 2017, the BEPS Monitoring Group noted that the tax rules were devised in and for another century, which

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[39] See OECD, 'Tax', www.oecd.org/tax, for the wide ranging cooperation with Key Partners, broader country programs covering more than 130 countries, collaboration with international and regional organisations and working groups that engage with business and civil society.

[40] OECD, 'Report by the Technical Advisory Group on Monitoring the Application of Existing Treaty Norms for the Taxation of Business Profits (Business Profits TAG)' (December 2000), http://www.oecd.org/ctp/treaties/1923350.pdf; OECD, 'Report by the Consumption Tax Technical Advisory Group (TAG)' (December 2000), http://www.oecd.org/ctp/consumption/1923240.pdf.

[41] OECD, 'Business Profits TAG', above n 40; OECD, 'Consumption Tax Technical Advisory Group', above n 40, setting out the respective mandates for the TAGs.

[42] Ottawa Framework, above n 34, para 4.

[43] Adopted by the Committee on Fiscal Affairs on 22 December 2000 following drafts released by Working Party No 1 on Tax Conventions and Related Questions in October 1999 and March 2000.

[44] OECD, 'Tax Administration Aspects of Electronic Commerce: Responding to the Challenges and Opportunities', Report from the Forum on Strategic Management to the Committee on Fiscal Affairs (February 2001).

[45] Ottawa Framework, above n 34, para 5.

[46] Ibid 13.

[47] OECD, *Implementation of the Ottawa Taxation Framework Conditions: The 2003 Report* (OECD Publishing, 2003) 9.

[48] See Alley, Bentley and James, above n 36.

[49] OECD, *Implementation of the Ottawa Taxation Framework Conditions*, above n 47, 9.

'exacerbates the challenges for international taxation' and requires a 'paradigm shift'.[50] The tax system may have changed little, as there was general acceptance that 'the use of the Internet and other networks are another extension of "normal" business activity…within established market and firm structures'.[51] By contrast, the global effort to confront tax evasion and address tax avoidance has had significant success in changing the rules governing 'abnormal' behaviours across multiple jurisdictions.

The OECD has consistently supported its member Governments in influencing a global response to tax evasion and avoidance.[52] The double tax treaty network has proven influential through the OECD *Model Tax Convention on Income and on Capital*, published in 1977, revising the OECD *Draft Double Taxation Convention on Income and Capital* of 1963.[53] Subsequent work on transfer pricing culminated in the 2009 Transfer Pricing Guidelines.[54] As noted above, the work on harmful tax competition led to the comprehensive global initiatives to counter BEPS.[55]

The BEPS actions offer an overt driver for tax system change to address particular behaviour in the face of digitalisation. The BEPS actions cover or affect the form of direct and indirect tax rules relating to those behaviours, ranging from interest deductions and financial payments, through business structures and transactions of related parties, to the detailed treatment of business presence and value add.[56] However, most of the submissions to the BEPS public consultation on the tax challenges of digitalisation argue against short-term change to the underlying tax rules and for a long-term multilateral solution, but only then if it is essential.[57] There is little evidence of general support for a substantial review of the global tax system.[58]

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[50] BEPS Monitoring Group, 'Submission on Tax Challenges of the Digital Economy', in OECD, 'Tax Challenges of Digitalisation: Comments Received on the Request for Input – Part I' (25 October 2017) 20, http://www.oecd.org/tax/beps/tax-challenges-digitalisation-part-1-comments-on-request-for-input-2017.pdf.

[51] OECD, *Implementation of the Ottawa Taxation Framework Conditions: The 2003 Report*, above n 47, 9.

[52] OECD Council, Recommendation of the Council on Tax Avoidance and Evasion C(77)149/Final, adopted on 21 September 1977, https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0158.

[53] Both these and the updated Treaties and Commentaries are available at: OECD, 'Tax Treaties', http://www.oecd.org/tax/treaties/.

[54] OECD, *OECD Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations* (2009), http://www.oecd.org/ctp/transfer-pricing/.

[55] OECD, *OECD/G20 Base Erosion and Profit Shifting Project: Explanatory Statement, 2015 Final Reports* (2015), https://www.oecd.org/ctp/beps-explanatory-statement-2015.pdf.

[56] Ibid and see OECD, 'Base Erosion and Profit Shifting', http://www.oecd.org/tax/beps/. An example of the success of the Australian Taxation Office's prosecution of transfer pricing and its anti-avoidance stance can be seen in *Chevron Australia Holdings Pty Ltd v Commissioner of Taxation* [2017] FCAFC 62, which reflects alignment with both the old and new approaches of the OECD. See *Income Tax Assessment Act 1936* (Cth) Div 13 and *Income Tax Assessment Act 1997* (Cth) Divs 815-A and 815-B, which include the OECD Transfer Pricing Guidelines approved by the OECD Council in 2016 and set out in OECD, *Actions 8-10 – 2015 Final Reports: Aligning Transfer Pricing Outcomes with Value Creation*, OECD/G20 Base Erosion and Profit Shifting Project (OECD Publishing, 2015), http://www.oecd.org/ctp/transfer-pricing/.

[57] See OECD, 'Public comments received on the tax challenges of digitalisation', available in two parts at: http://www.oecd.org/tax/beps/public-comments-received-on-the-tax-challenges-of-digitalisation.htm; OECD, *Tax Challenges Arising from Digitalisation – Interim Report 2018, Inclusive Framework on BEPS*, OECD/G20 Base Erosion and Profit Shifting Project (OECD Publishing, 2018), http://www.oecd.org/ctp/tax-challenges-arising-from-digitalisation-interim-report-9789264293083-en.htm.

[58] Apart from in isolated submissions such as that of the BEPS Monitoring Group, above n 50; and see OECD, *Tax Challenges Arising from Digitalisation*, above n 57, 212.

It is not surprising. The advent of electronic commerce was not conceived of when the international tax rules were designed in the early 20th century. The rules were designed to tax businesses where the business activity took place and to tax investors on their portfolio investment in their country of residence, with a credit for any source taxation paid. Multinational enterprises (MNEs) operated as independent entities and there were only basic transfer pricing rules to prevent profit shifting based on the 'arm's length' independent entity rule. When electronic commerce developed distributed, virtually located, but highly integrated global business models, it made sense to any adviser, manager or director to structure the operations to minimise tax and maximise returns to shareholders; hence the need for the BEPS project. Why support change that not only creates uncertainty but could upend existing business models?

It is salutary to consider that in 2001 the OECD Report confirmed that the principles that apply to taxation of conventional commerce should equally apply to e-commerce.[59] The 2003 Report noted that, 'since 1998, no new or pressing issues have been identified in relation to transfer pricing aspects of e-commerce'.[60] Since then BEPS has provided an explosion of activity, largely because the existing international tax rules do not and cannot effectively deal with a digital world, lacking most of the fundamental characteristics on which the original model was designed. We are rapidly moving to a world in which the taxation rules will need to transition in much the same way as the road rules will transition to regulate driverless vehicles.

Clearly at a point in time a 'crisis' will develop that requires comprehensive action, but this is likely to be driven from changes to domestic tax rules forced to cope with a digital world and then requiring an international framework for their interaction across borders. Why has there not been a push for this already?

Tax experts are grappling with how to change the rules to make them work. The concept of a nation state is losing its relevance in a global economy. Borders have ever declining relevance, other than as markers of different regulatory environments. Ironically, in the same way that in the Middle Ages, taking one route might have cost more tolls and agency costs than another, so in the digital era, the same applies. Business and governments usually act rationally to reduce agency costs and to maximise interests. It is only in the tax sphere that artificial boundaries suddenly become important. As in the pre-industrial era and before the development of highly regulated nation states, the difficulty lies in the power to control economic activity.

In addition, there is little agreement on the supporting evidence and research for new frameworks. Alternative but coherent and consistent frameworks that take account of a digital world, and a 'crisis' sufficient to galvanise support for change, are absent. Another part of the problem is that the digital economy is still forming. The rate of change is such, with inventions currently in progress that are likely to provide substantial economic shifts, that it is too early to put forward a solution sufficiently flexible to cater for future developments.

This brings us back to the most effective vehicle for change flowing from the review of the taxation aspects of electronic commerce: tax administration and compliance.[61] There

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[59] OECD, *Implementing the Ottawa Taxation Framework Conditions*, above n 37, 11.
[60] OECD, *Implementation of the Ottawa Taxation Framework Conditions: The 2003 Report*, above n 47, 18.
[61] OECD, 'Tax Administration Aspects of Electronic Commerce', above n 44.

are now numerous and increasing instruments, agreements, guidelines, and forums that will support the rapid adoption and use of digital technologies to make tax administration and compliance more domestically and globally effective.

In recent years the Global Forum on Transparency and Exchange of Information for Tax Purposes has seen the implementation of the 2011 Multilateral Convention on Mutual Administrative Assistance in Tax Matters, the implementation of the internationally agreed standards for the exchange of information on request (EOIR), and automatic exchange of financial account information (AEOI).[62] There has been significant improvement in cooperation in fighting tax crimes and co-ordinating with anti-money laundering activity.[63] The Forum on Tax Administration provides a comprehensive network for cooperation and agreement, in areas such as training to improve tax administration, compliance, service and use of digital technologies.[64]

These agencies and initiatives are instruments of soft power, and the harbinger of disruptive change that will keep pace with digital technologies far more effectively than the tax rules themselves.[65]

It may be that a crisis can be averted for some time if the rate of decline of the global tax take is moderated. BEPS will undoubtedly support the budgets of those jurisdictions aggressively protecting their share of taxation. Economic growth will not only support rapid digital developments worldwide, it will also provide fiscal relief to most jurisdictions dependent largely on direct and indirect taxation related to domestic employment and consumption. Physical asset-based taxes ranging from resource extraction taxes to land and capital gains taxes, will also provide economic support.

Nonetheless, given benign associated economic forecasts concerning the level of digital disruption discussed above, it is unlikely that the impact on tax compliance and tax revenue collection has been fully factored into scenarios. This will become evident through the examples and their possible impact analysed below.

Add to this the extant issues that are driving the post-Global Financial Crisis (GFC) global economy. While there has been a substantial period of uninterrupted growth since 2009, it is suggested that this is a result of loose monetary policy and development of the digital economy. The Productivity Commission notes that inflation has largely remained consistently low since the 1990s and productivity has slowed.[66] Economic growth has relied on the consistent reduction in costs, with revenue growth that has not

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[62] See Global Forum on Transparency and Exchange of Information for Tax Purposes, *Tax Transparency 2017: Report on Progress* (OECD Publishing, 2017), http://www.oecd.org/tax/transparency/global-forum-annual-report-2017.pdf.

[63] OECD, *Improving Co-operation between Tax and Anti-Money Laundering Authorities* (OECD Publishing, 2015).

[64] The work of the Forum on Tax Administration is described at OECD, 'Forum on Tax Administration', http://www.oecd.org/tax/forum-on-tax-administration/, and includes the International Compliance Assurance Programme and the influential *OECD Tax Administration Comparative Information* Series.

[65] For a description of the impact of soft power, see Duncan Bentley, 'Influence from the Shadows: The OECD, The Shape of Domestic Tax Policy and Lessons for Federal Systems' (2003) 13 *Revenue Law Journal* 128 and Duncan Bentley, 'The Rise of "Soft Law" in Tax Administration – Good News for Taxpayers?' (2008) 14(1) *Asia-Pacific Tax Bulletin* 32.

[66] Productivity Commission, above n 10.

flowed through to wages.[67] Living standards have decreased, giving rise to political disenchantment and disruption.[68]

Economic forecast assumptions include productivity growth and wage increases that constitute a significant upward change in the recent trend.[69] The change may well be occurring. However, it appears that the budget assumptions for tax revenue growth[70] have been made based on different aspects of growth in revenue, from individual and indirect taxation at the Commonwealth level and State taxes on property and payroll, than the anticipated wage and productivity-based growth suggest is possible.[71]

This section has shown that there are therefore at least two major problems for revenue authorities. The first problem is that the impact of digital transformation on society is almost impossible to predict. Labour markets, productivity growth and the pace and shape of change all demand analysis and an attempt at prediction. Yet, the assumptions in the models used largely have to ignore the effect of these factors, because it is still like grasping at straws in the wind. Economic modelling of revenue collection in these circumstances may prove accurate, but it is likely to be by accident rather than intention.

The second problem is that recent history shows that changes to tax rules and systems are hard fought and take a very long time. Although tax operates globally, vested interests are often local. The Electronic Commerce and BEPS consultation and collaboration has, however, provided an extensive network for governments to collaborate with key stakeholders, particularly if there is a crisis.

There are also at least two broad solutions for revenue authorities. The first is that, collectively, revenue authorities (and, over time, most stakeholders) have seized on the benefits of digital transformation to improve tax administration and compliance. It has been a core component of the response to electronic commerce and recent technological developments.[72] They form a critical component of the Australian Taxation Office strategy.[73] The benefits will be significant when these are combined with generalised adoption of technologies and development of artificial intelligence (AI) supporting automation of areas such as information and document management, data mining, predictive analytics, and machine learning. The second solution is that the nature of business and business models are likely to change at a rate that will force rule changes, simply to keep pace with taxpayer expectations.

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[67] David Jacobs and Alexandra Rush, 'Why Is Wage Growth So Low?' (June Quarter 2015) *Reserve Bank of Australia Bulletin* 9, https://www.rba.gov.au/publications/bulletin/2015/jun/pdf/bu-0615-2.pdf.

[68] See, for example, Schwab, above n 23 and, for analysis, Branko Milanovic, *Global Inequality: A New Approach For The Age Of Globalization* (Harvard University Press, 2016).

[69] Australian Treasury, *Budget 2017-18* (2017); Australian Treasury, *Mid-Year Economic and Fiscal Outlook 2017-18* (2017), and Australian Treasury, *Stronger Growth: To Create More and Better Paying Jobs, Budget 2017-18* (2017), http://www.budget.gov.au.

[70] See Australian Treasury, *Budget Strategy and Outlook 2014-15: Budget Paper No 1* (2014), particularly *Statement 3: Fiscal Strategy and Outlook* and *Statement 5: Revenue*, http://www.budget.gov.au/2014-15/content/bp1/html/index.htm.

[71] Australian Bureau of Statistics, *Taxation Revenue, Australia, 2015-16*, Cat 5506.0 (2017), http://www.abs.gov.au/ausstats/abs@.nsf/mf/5506.0; OECD, *Tax Challenges Arising from Digitalisation*, above n 57, 202.

[72] Ottawa Framework, above n 34 and BEPS consultation, above n 50.

[73] For example, Australian Taxation Office, *2017-18 Corporate Plan* (2017), https://www.ato.gov.au/uploadedFiles/Content/CR/downloads/n7769_08_2017_js39469.pdf.

What this means is set out in the next section. Potential consequential effects on taxpayer rights, which require urgent consideration,[74] are addressed thereafter.

4.   DIGITAL DISRUPTION OF TAX ADMINISTRATION AND COMPLIANCE

This section outlines the different digital developments likely to impact on tax administration and compliance.[75] These in turn will help shape the changes to tax frameworks and rules developed for a digitally supported world. Most commentary focuses on generalities. It is helpful to explore the detail, which will identify potential change and, equally importantly, the issues that need attention now to assure the continued long-term protection of taxpayer rights.

There are three overarching issues particularly relevant to digital disruption of tax administration and compliance. The first is the turbulence of the environment, the second is the importance of data and its diffusion, and the third is the danger of a growing gap between technology availability and technology adoption.

It is important to note the turbulence of the environment and that it is inevitable that much innovation will fail before the environment stabilises. Aversa, Mesquita and Anand identify three factors to identify turbulence, all of which are present today: (i) a high magnitude of change affecting structures, technological standards, and competition; (ii) a high frequency of change making it difficult for industry players to keep up, and (iii) little predictability in the timing and effect of change.[76] Tax administrators must balance early adoption with the risk of technological obsolescence.[77]

Second, it is arguable that for knowledge and service-based sectors, which encompasses tax administration and compliance,[78] data will help drive the direction of change.[79] Digital business models are dependent on different ways of collecting, collating, linking and using big data, and applying complex algorithms, advanced software and newly developed intellectual property and know-how. Digital business models are changing

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[74] Also addressed in the ATO *2017-18 Corporate Plan*, ibid.

[75] The pace of change means that this section necessarily relies on contemporaneous coverage of research in progress rather than published research outputs. See further on the current conceptualisation of the issues in OECD, *Tax Challenges Arising from Digitalisation*, above n 57.

[76] Alessandro Marino et al, 'Driving Performance via Exploration in Changing Environments: Evidence from Formula One Racing' (2015) 26(4) *Organization Science* 1079 and see further, Scott Berinato, 'Sometimes, Less Innovation Is Better: Professor Aversa, Defend Your Research' (2017) 95(3) *Harvard Business Review* 38.

[77] For an analysis of the risks and suggested approach, see Peerasit Patanakul et al, 'What Impacts the Performance of Large-Scale Government Projects?' (2016) 34(3) *International Journal of Project Management* 452; Matthias Daub et al, 'Digitizing the State: Five Tasks for National Governments' *McKinsey and Company* (November 2017), available at: https://www.mckinsey.com/industries/public-sector/our-insights/digitizing-the-state-five-tasks-for-national-governments (accessed 22 January 2019).

[78] Aurélie Barnay et al, 'Four Innovations Reshaping Tax Administration' McKinsey and Company (January 2018), available at: https://www.mckinsey.com/industries/public-sector/our-insights/four-innovations-reshaping-tax-administration (accessed 22 January 2019).

[79] See Thomas H Davenport and Jeanne G Harris, *Competing on Analytics: The New Science of Winning* (Harvard Business School Press, 2017); Thomas H Davenport and Julia Kirby, *Only Humans Need Apply: Winners and Losers in the Age of Smart Machines* (Harper Business, 2016); Uthayasankar Sivarajah et al, 'Critical Analysis of Big Data Challenges and Analytical Methods' (2017) 70 *Journal of Business Research* 263.

and growing exponentially and in ways different from initially conceived.[80] Diffusion of technology is changing data transfer and the rapid development of communications technology is driving, for example, government focus on the space industry (supporting satellites, geolocation and communication), which will facilitate access and capability development at scale.[81]

Third, growth in digital platforms, the increasing prevalence of short-term contracts and freelance work over permanent jobs ('gig' economy) [82] and demographic changes to the workforce, mean there is continued growth in small businesses, in particular unincorporated small businesses, and significantly 'at the lower end of the gross income distribution'.[83] This raises challenges for administration, assessment and collection in the current environment. As noted in a recent IMF Working Paper, taxes become more difficult to collect, the taxes themselves create distortions as small businesses have a propensity to avoid and evade them, and using low thresholds to support small businesses can result in revenue gains falling below the administrative burden.[84]

Definitions need to be better understood and developed to classify the components of economic growth in the new economy. Policy-makers can then identify and tax them according to normal principles or adapt those principles. This was the approach taken by the TAGs in the response to electronic commerce described above.

There are numerous technologies in different stages of development. While different categories of technologies will undoubtedly impact on tax administration and compliance, the three most relevant discussed in this article are:[85]

(a)   *Electronics and systems*, in which speed (faster connection including quantum computing); deployment (delivery of knowledge and products through different devices and in radically different forms including telepresence); and connectivity (seamless interoperability between systems, networks and across borders); are critical elements.

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[80] See for example, OECD, *Tax Challenges Arising from Digitalisation*, above n 57, 23; Christian Arnold, Daniel Kiel and Kai-Ingo Voigt, 'How the Industrial Internet of Things Changes Business Models in Different Manufacturing Industries' (2016) 20(8) *International Journal of Innovation Management* 1; Gerrit Remane et al, 'Discovering New Digital Business Model Types – A Study of Technology Startups from the Mobility Sector' (2016) *PACIS 2016 Proceedings* 289, https://aisel.aisnet.org/pacis2016/289.

[81] Expert Reference Group (Dr Megan Clark, chair), 'Review of Australia's Space Industry Capability: Issues Paper – August 2017', https://consult.industry.gov.au/space-activities/review-of-australian-space-industry-capability/.

[82] OECD, *Tax Challenges Arising from Digitalisation*, above n 57, 196. Analysed in Mark Graham, Isis Hjorth and Vili Lehdonvirta, 'Digital Labour and Development: Impacts of Global Digital Labour Platforms and the Gig Economy on Worker Livelihoods' (2017) 23(2) *Transfer: European Review of Labour and Research* 135; and for legal aspects, see Orly Lobel, 'The Gig Economy and the Future of Employment and Labor Law' (2017) 51(1) *University of San Francisco Law Review* 51.

[83] Aqib Aslam and Alpa Shah, 'Taxation and the Peer-to-Peer Economy' (IMF Working Paper WP/17/187, 18 August 2017) 28; Australian Small Business and Family Enterprise Ombudsman, *Small Business Counts: Small Business in the Australian Economy* (2016), http://www.asbfeo.gov.au/sites/default/files/Small_Business_Statistical_Report-Final.pdf.

[84] Aslam and Shah, above n 83.

[85] For an overview of the technological opportunities and their implications, see McKinsey and Company, *Digital Australia: Seizing the Opportunity from the Fourth Industrial Revolution* (2017), https://www.mckinsey.com/featured-insights/asia-pacific/digital-australia-seizing-opportunity-from-the-fourth-industrial-revolution. The categorisation was derived from analysis of the advanced research being undertaken by universities.

(b)   *Big data, automation and artificial intelligence*, in which data can be mined and used to enhance administration through automation, cognition and machine learning.

(c)   *Security, including blockchain*, in which secure transactions are stored using cryptography in a distributed ledger, and the counterpoints of *cybersecurity and cybercrime*, will become fundamental both to storage of government data and the capability of tax authorities to investigate and assure compliance.

Other categories will impact more directly on the tax rules themselves, as knowledge, products and services are disrupted to create taxable value-add in ways we are yet to discover. Examples include the internet of things (for example, driverless cars, and home automation); wearable technologies (for example, implanted and connected sensors to transform healthcare, sporting performance and criminal justice systems); and advanced manufacturing (for example, 3D printing, synthetic biology, and new materials). These categories are beyond the scope of this article but how they will affect taxation warrants further research.

The next section analyses and interprets the potential impact on tax administration of the three categories identified above. It does so in the context of systems, compliance and administrative elements of the tax rules.

4.1   Electronics and systems

Australian Government and Australian Taxation Office (ATO) systems are being designed and configured to implement across three sets of requirements. These are:[86]

1.   current operational requirements, which involve updating and adapting *existing* systems and assuring continuity of service;

2.   current strategic requirements that deliver *known future* technologies to deliver digital strategies; and

3.   future operational and strategic requirements, which will require adaptation to deliver *unknown future* technologies.

Government is expected to deliver through the turbulence of new technologies. As discussed, some of these may fail. Add to this the challenge of the changing nature of technology. Particularly significant has been the move from historical proprietary systems, where governments could create or buy hardware and software that it owned and controlled, to the advent of cloud technologies, integrated platforms, and the need to adapt to rapidly changing standards, simply to provide a seamless technology delivery platform.[87] Whereas traditionally government, as a product of size, invests in major infrastructure and technology projects taking years to implement, it must become

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[86] Identified in Department of the Prime Minister and Cabinet, *Public Sector Data Management* (July 2015), https://www.pmc.gov.au/sites/default/files/publications/public_sector_data_mgt_project.pdf. Endorsed in Productivity Commission, *Data Availability and Use*, Inquiry Report No 82 (31 March 2017) 93, https://www.pc.gov.au/inquiries/completed/data-access/report/data-access.pdf; implemented Australian Government, Digital Transformation Agency, 'Digital Transformation Agenda', https://www.dta.gov.au/what-we-do/transformation-agenda/.
[87] Productivity Commission, *Data Availability and Use*, above n 86, chs 4 and 8 and Appendix D. See, Australian Government, Digital Transformation Agency, 'Corporate Plan 2017-21', https://www.dta.gov.au/who-we-are/corporate/plan/.

adaptable and work with third parties to implement smaller projects at speed.[88] Vitally, for the protection of society and its citizens, it must lead on security, standards and the rules governing information management.[89]

Governments like Australia have advanced digital strategies in place and are implementing them as rapidly as resources and capability allow.[90] As they develop an enterprise architecture to meet the three sets of requirements outlined above, it is notable that smaller OECD countries have had the resources and capability to take advantage of their size. Norway,[91] Singapore[92] and New Zealand[93] provide useful examples of different approaches that supplement the ATO's own sophisticated development of systems to support new technologies.[94] Their experiences show that government requires agreed principles underpinning its enterprise architecture, common administrative standards, adoption of enterprise-wide components, common security standards and standards for reuse of public information.[95]

Analysis of the plans for these four jurisdictions suggests that, in designing a system, there are broad principles which should apply.[96] The Norwegian principles were published in 2012,[97] but have stood the test of time and are used with adaptation (mainly for terminology) from the more recent plans of the other jurisdictions:[98]

1. *Service orientation*: Facilitation of life event personalisation requires push communications and discoverable, joined-up services, with secure, single authentication.

2. *Interoperability*: ICT systems must be able to exchange and share data, services and information with other systems, through standardised interfaces and reusable digital platforms. This includes third party service, data integration, and use of natural systems.

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[88] McKinsey and Company, *Government Productivity*, above n 1; Department of the Prime Minister and Cabinet, above n 86 and Digital Transformation Agency, 'Corporate Plan 2017-21', above n 87.

[89] Productivity Commission, *Data Availability and Use*, above n 86, 172.

[90] See Digital Transformation Agency, 'Corporate Plan 2017-21', above n 87 and ATO, *2017-18 Corporate Plan*, above n 73, particularly its ICT capability strategy and performance targets.

[91] Norwegian Ministries, *Digitizing Public Sector Services: Norwegian eGovernment Program* (2012), https://www.regjeringen.no/globalassets/upload/fad/kampanje/dan/regjeringensdigitaliseringsprogram/dig it_prg_eng.pdf.

[92] See Inland Revenue Authority of Singapore, 'Turning 25 – Towards A New Digital Era', https://www.iras.gov.sg/irashome/About-Us/Our-Organisation/Turning-25---Towards-A-New-Digital-Era/.

[93] See Inland Revenue Department, New Zealand, 'Our Business Transformation Programme', https://www.ird.govt.nz/transformation/bt-programme/bt-programme-section-contents.html.

[94] See Australian Taxation Office, *2018-19 Corporate Plan* (2018), https://www.ato.gov.au/uploadedFiles/Content/CR/downloads/ATO%20Corporate%20plan%202018-19.pdf.

[95] Digital Transformation Agency, 'Corporate Plan 2017-21', above n 87. In New Zealand, see the Business Transformation Programme, https://www.ird.govt.nz/transformation/bt-programme/bt-programme-section-contents.html; Inland Revenue, 'Transformation Briefing for the Minister of Revenue' (November 2017), https://www.ird.govt.nz/resources/5/c/5c310209-3cd6-4e57-be8c-8eee94d85848/transformation-briefing-for-the-minister-of-revenue.pdf.

[96] Digital Transformation Agency, 'Digital Transformation Agenda', above n 86; Norwegian Ministries, above n 91, 59. Productivity Commission, *Data Availability and Use*, above n 86, 311 recommends a principles-based, outcomes focused approach.

[97] Norwegian Ministries, above n 91.

[98] See particularly, the work of the Australian Digital Transformation Agency, above n 86.

3. *Accessibility*: Electronic user services require open and extensible design, with universal user access regardless of time, location, and channel.

4. *Security*: Information and services must comply with confidentiality, quality, accessibility, and monitoring requirements, while providing streamlined authentication.

5. *Openness*: Public ICT systems must be based on open or approved standards with appropriate government support. The systems should not entail compliance with special technology requirements on the part of users and should allow third party provision.

6. *Trust*: Requires increased transparency and coordination of digital transformation with built in assurance for high risk/high impact projects, with clear benefits realisation.

7. *Flexibility*: The public sector should establish and develop ICT systems to facilitate changes in use, content, organisation, ownership, and infrastructure.

8. *Scalability*: ICT systems should facilitate changes in terms of the number of users, data volume and lifespan of services, while ensuring stability of project and service delivery.

The nature of the technologies means that the challenges are significant in giving effect to these principles so that they also protect citizen and taxpayer rights. Citizens, tax authorities, and third-party providers will expect to use the latest technologies: their expectations will differ. The implications are often untested. The tax rules, as noted above, were not designed for seamless, whole-of-government, information flows, particularly using multiple third parties.[99] Neither were they designed for cross-jurisdictional information flows also often using multiple third parties governed by derivative contracts, sometimes with no connection (or regulatory obligation) to the governments of the jurisdictions involved.[100]

Systems and digital architecture will become as important to taxpayer rights and obligations as are current processes. For example, the embedded design, algorithms, processes, and configuration of authentication encryption and blockchain technologies have inherent characteristics, which will determine whether security and access requirements are met.

Commercial partnerships, cloud technologies, and appropriate commercial 'off-the-shelf' software will significantly enhance tax administration capability. They will also reduce costs. New Zealand has robust frameworks for such collaboration and has pioneered the more cost-effective, iterative, digital systems development, eschewing traditional linear project approaches.[101] Singapore's Inland Revenue Authority (IRAS)

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[99] Bentley, *Taxpayers' Rights*, above n 27, 318.
[100] Ibid and see Tonny Schenk-Geers, *International Exchange of Information and the Protection of Taxpayers* (Kluwer Law International, 2009).
[101] In New Zealand, see KPMG, *Inland Revenue: Independent Quality and Technical Assurance, Business Transformation Programme, IQA6/TQA5* (2017), https://www.ird.govt.nz/resources/0/f/0f962fcc-75ea-4bbd-a4f2-45b4d5a92334/IQA6TQA5-2017.pdf.

is a leader in partnering with software developers to collaborate and co-create solutions through the community and intermediaries.[102]

However, there are risks to third party provision and partnerships. They can also give rise to potential issues or embedded security gaps, that may only be discovered subsequently, as technology develops. The advantage of working with leading technology players is that they will have the resources to continuously monitor, deploy, and quickly resolve or patch problems, together with deep pockets to meet contractual breach obligations. Nonetheless, organisations such as WikiLeaks and multiple investigations following the 2016 US elections have shown the detrimental effect of even short-term security breaches. Security will remain a critical issue and is discussed further below.

Externally, the ATO and government will drive digital implementation across the SME sector, through requirements for digital reporting and government procurement, which will also support productivity across the Australian economy.[103] The alternative for government is to be a drag. This has not been such an issue in the past,[104] but increasingly, the role of government is to support and help transition SMEs to using digital technologies, through targeted policy.[105] For policy implementation of this kind, which uses digital technologies as a vehicle to improve Australia as a society, the principles outlined above will help assure appropriate protection of taxpayer rights and obligations. Nonetheless, issues arise, and these are addressed in section 5.

4.2   Big data, automation, and artificial intelligence

This section analyses[106] critical elements of big data, automation and artificial intelligence (AI), which impact most directly on taxpayer rights and obligations. It provides a high-level overview of the technologies and processes, so that the implications for taxpayer rights can be identified in section 5.

For the purposes of this article, big data refers to analysis of often massive information sets (although tools are increasingly applied to small sets), which are often diverse or 'messy', using high speed processing, to enable valuable insights, decision-making and process automation, that is economically viable.[107] Taxpayer information held

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[102] See Inland Revenue Authority of Singapore, 'Partnership with Software Developers', https://www.iras.gov.sg/irashome/About-Us/Public-Engagement/Partnership-with-Software-Developers/, and the IRAS marketplace to work with developers on Application Programming Interfaces (APIs).

[103] This is part of the Australian Government's Digital Transformation Agenda, above n 86. See also Elizabeth Thurbon, 'Australia' in Veiko Lember, Rainer Kattel and Tarmo Kalvet (eds), *Public Procurement, Innovation and Policy: International Perspectives* (Springer, 2014) 35; European Commission, *Public Procurement as a Driver of Innovation in SMEs and Public Services* (2014).

[104] Digital Transformation Agency, 'Digital Transformation Agenda', above n 86.

[105] McKinsey and Company, *Digital Australia*, above n 85, 154; Thurbon, above n 103.

[106] The analysis and conclusions in this section are largely drawn from discussions with the Swinburne University of Technology Data Science Research Institute and from the readings footnoted throughout this article. See also Jacques Bughin et al, 'Artificial Intelligence: The Next Digital Frontier?' (McKinsey and Company Discussion Paper, June 2017), https://www.mckinsey.com/~/media/McKinsey/Industries/Advanced%20Electronics/Our%20Insights/How%20artificial%20intelligence%20can%20deliver%20real%20value%20to%20companies/MGI-Artificial-Intelligence-Discussion-paper.ashx.

[107] For a general description, see Wolfgang Ertel, *Introduction to Artificial Intelligence* (2nd ed, 2017) and the definitions in ch 1; Huimin Lu et al, 'Brain Intelligence: Go Beyond Artificial Intelligence' (2018) 23(2) *Mobile Networks and Applications* 368; Valerie A Logan, *Fostering Data Literacy and Information as a Second Language: A Gartner Trend Insight Report* (23 February 2018).

electronically by the ATO would be a typical vehicle for big data analysis. Automation and AI is where computer technology automates or simulates work requiring some level of human intelligence, or cognition.[108] The technology may not undertake the work in the same way as a human, but the output, to be viable, would be carried out better, faster, or more effectively than a human could do it.

It is arguable that artificial intelligence and cognitive computing are different, but the analysis below treats them as steps on the continuum.[109] Stoica et al, argue that:

> AI has evolved towards a broadly applicable engineering discipline in which algorithms and data are brought together to solve a variety of pattern recognition, learning, and decision-making problems. Increasingly, AI intersects with other engineering and scientific fields…[110]

The understanding and definitions will adapt both with the technology and attempts to regulate it.[111]

Why should the ATO lead government in AI?[112] The sectors enabling the operation of the ATO, namely tax agents, tax advisers, and the financial services sectors, are all leaders in the development of AI.[113] An effective tax system requires the ATO to keep technological pace with its key agents and partners. In addition, failure to do so undermines government legitimacy.[114] The ATO has a long history of leading in technology and it has proved instrumental to the effectiveness and efficiency of both its administration and compliance roles.[115] It is already exploring, in conjunction with other OECD tax administrations, cognitive computing, blockchain technology, artificial intelligence and robotics.[116] What might this look like?

There are currently three main types of AI (incorporating cognitive computing):[117] process automation, cognitive insights and cognitive engagement. Cognitive computing

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[108] Ertel, above n 107; Lu et al, above n 107; Logan, above n 107.

[109] Dean Evans, 'Cognitive Computing vs Artificial Intelligence: What's the Difference?' *iQ Tech Innovation* (28 March 2017), available at: https://iq.intel.co.uk/cognitive-computing-vs-artificial-intelligence/ (accessed 22 January 2019).

[110] Ion Stoica et al, 'A Berkeley View of Systems Challenges for AI', [cs.AI] (15 December 2017) 1, https://arxiv.org/pdf/1712.05855.pdf.

[111] Matthew U Scherer, 'Regulating Artificial Intelligence Systems: Risks, Challenges, Competencies, and Strategies' (2016) 29(2) *Harvard Journal of Law and Technology* 353, 358.

[112] Centre for Public Impact, 'Destination Unknown: Exploring the Impact of Artificial Intelligence on Government' (Working Paper, September 2017), https://publicimpact.blob.core.windows.net/production/2017/09/Destination-Unknown-AI-and-government.pdf.

[113] Michael Chui, James Manyika and Mehdi Miremadi, 'What AI Can and Can't Do (Yet) For Your Business' (January 2018) *McKinsey Quarterly* 1, https://www.mckinsey.com/business-functions/mckinsey-analytics/our-insights/what-ai-can-and-cant-do-yet-for-your-business?cid=other-eml-alt-mkq-mck-oth-801&hlkid=5f07e428dbdb40b4a2a297d5cc731eb7&hctky=2780378&hdpid=d3bf26bf-7f43-48fd-8f9d-9770bfb5f550.

[114] Centre for Public Impact, above n 112, 3.

[115] See Bentley, 'The ATO, Tax and the Internet', above n 33; OECD, *Tax Administration 2017: Comparative Information on OECD and Other Advanced and Emerging Economies* (2017) 122; Agung Darono and Danny Ardianto, 'The Use of CAATTs in Tax Audits – Lessons From Some International Practices' (2016) 14(2) *eJournal of Tax Research* 506.

[116] ATO, *2017-18 Corporate Plan*, above n 73; OECD, *Tax Challenges Arising from Digitalisation*, above n 57, 202; OECD, *Tax Administration 2017*, above n 115, 32.

[117] Thomas H Davenport and Rajeev Ronanki, 'Artificial Intelligence for the Real World: Don't Start With Moon Shots' (2018) 96(1) *Harvard Business Review* 108.

is at an early stage of development. However, this section outlines the potential applications to tax administration. For all three types of AI identified here, big data sets will prove invaluable.

4.2.1   Big data

The ATO and State Revenue Departments have some of the most comprehensive datasets available.[118] They are among the most accurate as they have been based on legally required disclosure, checked and reviewed annually by both the revenue authorities and by the third parties required by legislation to provide accurate reporting, and validated by taxpayers, and often by tax agents.[119]

The tax administration data is more comprehensive, accurate and continually updated compared with almost any other dataset, particularly government datasets, such as the five-yearly census, on which so much policy development depends.[120] Its longitudinal nature is invaluable as a social and economic history of the nation in combination with other government data. For use in developing cognitive computing, patterns of behaviour revealed through the data will become as important as the data itself.[121] This is already evidenced at scale in the large user platforms run by firms such as Amazon, Facebook, Baidu and Google.[122]

From a digital perspective, tax administration datasets have a significant advantage for multiple use that will allow incremental adoption of digital advances to the benefit of both governments and taxpayers. The data is and has to be labelled to a far greater level of detail and accuracy than most datasets. One of the greatest challenges to data reporting, integration and general use is accurate identification, and tax data overcomes this.[123] While supervised machine learning can develop more effective labels, the greater the degree of accurate, systematic, organisation of the information within a dataset the more easily it can be shaped for improved and different uses, taking advantage of fine-grained patterns.[124]

The revenue authorities have a range of uses for their datasets. For example, they do want to improve the stakeholder satisfaction of those interacting with them.[125] For this (customer experience) they can adapt approaches the major search engines and retail companies take to improve user satisfaction, user experience and predictive purchasing. However, most uses require meticulous accuracy to comply with extensive and complex legislative requirements and this still requires testing and development. However, the

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[118] Commissioner of Taxation, *Annual Report 2016-17* (2017) 77, https://www.ato.gov.au/about-ato/annual-report-2016-17/.

[119] Discussed with comparisons in OECD, *Tax Administration 2017*, above n 115. See further, Tax Practitioners Board, *Annual Report 2016-17* (2017),
https://www.tpb.gov.au/sites/default/files/tax_practitioners_board_annual_report_2016-17.pdf?v=1512953017.

[120] See further, Australian Bureau of Statistics, 'Census', http://www.abs.gov.au/census.

[121] The ATO uses behavioural insights and is investing in advanced capabilities: Commissioner of Taxation, *Annual Report 2016-17*, above n 118, 23.

[122] Bughin et al, above n 106, 9; Stoica et al, above n 110, 2.

[123] Lina Zhou et al, 'Machine Learning on Big Data: Opportunities and Challenges' (2017) 237(C) *Neurocomputing* 350.

[124] Ibid.

[125] Commissioner of Taxation, *Annual Report 2016-17*, above n 118, 14 and 92.

revenue authorities are starting from a necessarily high level of accuracy, which can allow them to leapfrog many corporate entities.

4.2.2　Process automation

Process automation represents the automation of administrative tasks both digital and physical. The ATO is well advanced in this area but is exploring the significant additional opportunities to make substantial efficiency gains for taxpayers across all the processes used in tax administration, to improve taxpayer compliance, and to reduce compliance costs.

Taxpayer and third-party data transfers into the tax administration and compliance processes meeting regulatory requirements provide the big data required for low-level machine-learning on big datasets. Regulatory implementation of interventions to secure the revenue base are already widespread.[126] These range from real-time use of compliance-focused analytics, to compulsory use of automated reporting for business transactions.[127] Third party (for example banks and large tax withholders) and platform-based transactions (Amazon, eBay and PayPal) provide significant opportunity to authenticate incomes and transactions and to build effective datasets.[128]

Currently the automation streamlines and automates multiple processes and data sets from different sources into a useable database, then extracts information and applies it to fulfil required functions. A primary example of a useable database is where the ATO streamlines data collection into what is termed a 'data lake'. The ATO will increasingly draw on data lakes from both taxpayer and third party returns to pre-fill returns, generate assessments, and automate the documentation required during the assessment management process.[129] While, currently, the systems cannot cope with taxpayers operating across different platforms using varied modes of business activity, employment and self-employment, investment and discretionary expenditure,[130] machine learning will build this capability over time. The ATO will automate a complete tax picture of every taxpayer.

Related use of data lake process automation will provide instant access to free form and natural language documents, which previously it was simply too difficult through size and complexity to enter into databases. It will become simpler to transfer data from e-mail, call-centre and other natural language and free-form inputs to create and update records. This will allow access to and effective use of information contained in contracts, letters of advice, email communications and other natural language documents. Not only will the tax data about each taxpayer grow, but so will patterns of data and information demonstrating intention. It will be one of the most intimate user interfaces and may prove confronting for taxpayers.

The opportunities to provide consistent and effective advice and interventions at scale will transform ATO interactions. A few of the promising areas for low-level automation

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[126] See OECD, *Tax Challenges Arising from Digitalisation*, above n 57, 202 and OECD, *Tax Administration 2017*, above n 115.

[127] OECD, *Tax Administration 2017*, above n 115, ch 4.

[128] Aslam and Shah, above n 83, 26.

[129] Ibid 29.

[130] See, for example, IMF, *Current Challenges in Revenue Mobilization: Improving Tax Compliance*, IMF Policy Paper (29 January 2015) and OECD, *Tax Administration 2017*, above n 115, 83.

using machine learning of this kind include taxpayer and third-party advice and intervention to encourage and support compliance in a real-time environment, collation and detailed analysis of transfer pricing data, collation and detailed analysis of audit information, more effective debt management with early intervention, and information collation and analysis to support dispute resolution management. Improved efficiency and effectiveness of compliance audit, appeal and enforcement procedures will significantly increase productivity, reduce costs, improve compliance, and increase revenue collection.

Components of process improvement are already in place,[131] but AI will allow this to move to the next level with growing use of machine learning to respond to variations in the data. The multiple variations required for authors, sportspeople and entertainers are an example. The value add will come in the ability to coalesce and use the information from multiple systems.

One of the immediate challenges for the ATO is to ensure that its systems are interoperable with third party providers, for example, banks and large and medium sized taxpayers to ensure accurate transfer of metadata. For individuals and small enterprises, a platform portal with the systems provided by the ATO and approved third parties will continue to develop.

Over time this may allow fully automated real-time tax recording and collection.[132] The goods and services tax (GST), payroll taxes, stamp duties and similar tax collection can be further automated. Arguably automated processing and collection can obviate much reporting and allow periodic taxpayer validation of ATO and State Revenue authority assessments removing the requirement for taxpayer-generated returns. The revenue authorities will already have all of the information on each taxpayer and should use it to reduce compliance costs.

Key areas for early piloting are the development of natural language capability that overcomes strict algorithmic definitions; and continued enhancement of low-level machine learning capability. These have already and will continue to mean that the ATO and other government departments can make significant service, efficiency, and productivity improvements.

Tax administrations, including the ATO, have already made significant advances in strengthening internal capabilities through pilot and segment projects. Together with the Global Forum on Tax Administration,[133] collaboration through the OECD, and other collaborative partnerships, the ATO is well-positioned to take full advantage of the next stage of process automation and subsequent investment in digital transformation more generally.

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[131] OECD, *Tax Administration 2017*, above n 115, reports that Nordic tax administrations have already developed capability to pre-fill 100 per cent of the data for selected groups of taxpayers resulting in significant reduction in administrative costs and high levels of compliance.

[132] Commissioner of Taxation, *Annual Report 2016-17*, above n 118, 37 describes existing Single Touch Payroll for substantial employers already in place.

[133] The Global Forum on Tax Administration, represents over 50 countries and produces the Comparative Information series on Tax Administration describing features of both tax administration and collaboration, see OECD, *Tax Administration 2017*, above n 115 and OECD, 'Forum on Tax Administration', above n 64.

4.2.3   *Cognitive insight*

Cognitive insight is the use of algorithms to detect patterns in data lakes and interpret their meaning. To do this, the models are trained using parts of the dataset, either by humans or, increasingly, through automated training. In this way, the models can improve through reinforcement or self-learning. Data curation is developing through machine learning and the incorporation of pattern recognition.

The revenue authorities have the training data sets available for the two main types of machine learning. The first method is through reinforcement learning, where instead of requiring humans to label, test, review, correct and improve, the machine learning can be programmed to achieve similar outcomes, with a greater degree of accuracy using large test datasets. The second method uses generative adversarial networks in which more than one network is programmed to compete to refine understanding of concepts. Given the size of the tax administration datasets, both may well be used for different purposes to develop both accuracy and refine the methodologies most suited to different elements of massive financial governance.

Cognitive insight will improve prediction of behaviours both existing and emerging in taxpayer subsets. This becomes valuable in response to changes in legislation, rulings and exogenous and endogenous factors affecting the subset in particular ways. For example, the ATO will gain early insight into behaviours responding to regulatory, economic or market changes affecting revenue generation and reporting, such as altered commission or incentive payments in an industry. It will allow the ATO to test different policy options in one taxpayer segment using analogous options applied in another segment. This should mean improvements in how regulation is implemented.

There is a clear intent for tax administrations to use cognitive insight to improve real-time detection of fraud, evasion and avoidance across taxpayer sets and across jurisdictions. Through bodies such as the Forum on Tax Administration,[134] tax authorities are sharing and building capability. The Comparative Information series on OECD and Other Advanced and Emerging Economies[135] describes and highlights global developments in tax administration.

While tax administrations have not yet harnessed cognitive insights of AI to an advanced level, there is clear intent. The examples provided already form a sophisticated basis on which to build machine learning capability. Ireland has a real-time risk model to assist in managing its value-added tax (VAT) administration and compliance.[136] Russia automatically cross-matches 'all VAT paid with all VAT claimed across all transacting parties'.[137] In both countries, the existing datasets potentially provide opportunities for advanced prediction in real-time, exploring behavioural insights, and automating communication. This might include instantaneous tailored communication to individual taxpayers or third parties in response to real-time activities.[138] These actions can be tailored to each level of the compliance and risk

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[134] OECD, 'Forum on Tax Administration', above n 64.
[135] OECD, *Tax Administration 2017*, above n 115.
[136] Ibid 99.
[137] Ibid 102.
[138] This is already in use at a basic level by the ATO through automated pop-up messaging. See Commissioner of Taxation, *Annual Report 2016-17*, above n 118, 23.

framework used by the tax administration, and use messaging designed to elicit the desired behaviours most effectively.[139]

The level of detail available to the ATO in its data lakes, will allow early development of sophisticated cognitive insight capability as soon as the technology can be implemented to make this feasible. This has the potential to generate advice to taxpayers flowing well beyond tax administration in a narrow sense.[140] It also offers opportunities to predict and assist taxpayers well in advance with problems ranging from cash flow management affecting their ability to pay tax and manage debts to providing comprehensive financial data analysis.[141] The latter would be based on predictive analytics drawn from datasets unmatched by banks or corporate advisers. For example, the ATO will be able to forecast when, how and why a company will fail, based on its characteristics, activities and the behaviours of its management. The implications are discussed further in section 5.

The potential for significantly greater actuarial and economic modelling will significantly increase government revenue forecasting as well as assisting in a whole-of-government initiative to model social and economic trends, developments and impacts to inform policy and decision-making. While forecasting will still not overcome future uncertainty, the validity of assumptions and scenario planning will become significantly more robust.

A related aspect of cognitive insight is image recognition, which will help with authentication, adding to the advanced voice recognition capability already in use.[142] Given that this is not currently a dataset in use by Australian revenue authorities, it is likely that they will need to purchase capability from third parties, such as financial institutions and perhaps legislate access to image datasets.[143] The ATO will need to adopt these elements of AI early and in collaboration with third parties, to secure what will become one of Australia's most valuable datasets. Existing cross-border and emerging global standards continue to reinforce an intergovernmental focus on identity and information security.[144] Failure to address this early and continuously will have significant negative consequences.

Speech and language recognition will allow improved translation capability. The latter may assist especially in automatic exchange of information. Pattern recognition will allow large-scale international audits with massive numbers of documents and transactions. Over time, it will also allow translation of information between different languages and tax families with different definitions and interpretations, which is currently simply too time-consuming to undertake.

Cross-jurisdictional information exchange has always been a particular challenge for tax administrations. Definitions and data labelling differ even between countries within the same tax families. Language exacerbates the challenge. Machine learning will, in

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[139] See, for example, Simon James, 'Taxation and Nudging' and Erich Kirchler, Barbara Hartl and Katharina Gangl, 'Income Tax Compliance' in Morris Altman (ed), *Handbook of Behavioural Economics and Smart Decision-Making: Rational Decision-Making within the Bounds of Reason* (Edward Elgar, 2017) 317 and 331.
[140] Commissioner of Taxation, *Annual Report 2016-17*, above n 118, 23.
[141] Ibid 33.
[142] Ibid 16, 17.
[143] Building on an existing partnership and collaboration framework. For example, see ibid 58.
[144] OECD, *Tax Administration 2017*, above n 115, 80.

time, overcome these difficulties and enable more effective bilateral and multilateral information exchange. Much of this will be automated and compliance activity can be monitored using predictive behaviour and pattern recognition in similar ways that are used to monitor and predict credit card fraud. However, cognitive insight into and use of natural language data will provide a more detailed and fine-grained understanding of behaviour and transactions.

4.2.4   Cognitive engagement

Image recognition for identification will potentially prove an important efficiency for the ATO. Other cognitive engagement under development includes the use of natural language processing chatbots and intelligent agents, building on cognitive insights and machine learning. The ATO and New Zealand Inland Revenue Department are already using early versions to engage with taxpayers.[145]

While the technology is in its early stages, there is significant potential to increase cognitive engagement with internal and external stakeholders. The kinds of activities that may in whole or part use cognitive engagement include:

1. Information and workload management to optimise ATO activities;

2. Responses to taxpayer and tax agent queries including each stage of the tax ruling system with personalised and tailored decision trees, showing consequences and return on investment to aid choices;

3. Complex technical reports;

4. Contribution to complex advice both internally and externally;

5. Contribution to complex assessment tasks;

6. Contribution to complex tax audit and compliance tasks;

7. Contribution to dispute resolution at all levels;

8. Contribution to policy development and complex technical analysis;

9. Streamlining, scaling, and improving responsiveness of ATO capability across complex areas, such as advance pricing agreements and complex audits;

10. Providing personalised, adaptive, just-in-time training for all ATO staff using combinations of AI and virtual reality;

11. Providing real-time monitoring of security, quality, risk and progress against targets to aid efficient ATO management.

This kind of cognitive engagement may seem aspirational, but elements already form part of the development of the courts and legal practice.[146] The early stages of development should allow the ATO to free staff to focus on more complex work such

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[145] The ATO's chatbot, Alex, is an early and effective version: see Commissioner of Taxation, *Annual Report 2016-17*, above n 118, 17.
[146] See, for example, Hon Justice Melissa Perry, 'iDecide: Administrative Decision-Making in the Digital World' (2017) 91(1) *Australian Law Journal* 29, 30; Lyria Bennett Moses, 'Artificial Intelligence in the Courts, Legal Academia and Legal Practice' (2017) 91(7) *Australian Law Journal* 561.

as dealing with higher level disputes, issues requiring extended stakeholder interaction, and examining and acting on data allowing predictive intervention.[147] Machines and networks will increasingly communicate among themselves using neural networks and transfer learning, which allow machine learning across boundaries to create a broader version of AI than is currently available.[148]

Many of the more complex ethical and rights issues associated with advanced cognitive engagement remain opaque at this early stage of technology development. However, the issues arising from other elements of AI will form a useful basis for future research, analysis, and rule-making.

4.3 Security

Security is a feature of digital transformation. While cryptocurrencies and blockchain opportunities have caught investor imagination, regulation is moving rapidly to provide appropriate protection to the public. For example, for taxpayers in Australia, the *Privacy Amendment (Notifiable Data Breaches) Act 2017* (Cth) requires organisations covered by the *Privacy Act 1988* (Cth) to notify the Australian Information Commissioner and affected individuals when they experience a data breach. This builds on similar international activity, such as the US Department of Commerce National Institute of Standards and Technology Framework developed in response to Executive Order 13636.[149]

ATO Governance is comprehensive as required under the *Public Governance, Performance and Accountability Act 2013* (Cth). In addition to the *Privacy Act 1988* and Division 355 of Schedule 1 of the *Tax Administration Act 1953* (Cth), there are multiple specific obligations to protect taxpayer information applicable in other acts.[150] These range from data matching, through the proper use of information technology equipment to national security provisions.[151]

As the ATO expands its information capability and develops networks of collaboration and partnership with third party organisations, the potential for direct and indirect breaches of regulations applicable to the ATO or its partners will increase. This will arise in part from inevitable blurred lines of accountability and liability. For example, notification by an ATO partner and third-party provider of breaches of the *Public Governance, Performance and Accountability Act 2013* may have flow-on effects for the ATO under the *Privacy Act 1988* or other governing regulation.

Although blockchain and other technologies threaten technological disruption of traditional methods of validation of transactions, their ubiquitous use is arguably still a

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[147] Richard Susskind and Daniel Susskind, *The Future of the Professions: How Technology Will Transform the Work of Human Experts* (Oxford University Press, 2015).
[148] Bughin et al, above n 106.
[149] See the US Department of Commerce, National Institute of Standards and Technology (NIST), 'Framework Documents', at https://www.nist.gov/framework.
[150] Commissioner of Taxation, *Annual Report 2016-17*, above n 118.
[151] Commissioner of Taxation, 'Privacy and Taxpayer Confidentiality', Chief Executive Instruction CEI 2014/06/06; Commissioner of Taxation, 'Data Matching – Special Purpose Acquisition Data Guideline', Chief Executive Instruction CEI 2014/01/08; Commissioner of Taxation, 'Proper Use of Information Technology Equipment', Chief Executive Instruction CEI 2014/04/05; Commissioner of Taxation, 'Security', Chief Executive Instruction CEI 2014/06/07.

long way off.[152] In simple terms blockchain provides an open, permanent, distributed ledger of validated transactions.[153] For tax administration the primary opportunities for use appear to be:[154]

1. A technological solution for secure, trusted transactions;

2. Immutable recording and reporting of data and other digitally stored records;

3. Management of encrypted digital identity;

4. A mechanism for smart contracts and auditing of digital records and transactions.

While security is a major advantage, blockchain currently relies on open governance and individual users interacting with the ledger using private keys. This opens potential security vulnerabilities through both the individual and the interaction between different ledgers.[155] A second governance issue will be to determine who bears the risk and the liability for failure.[156] A third issue that will slow adoption is that, to be accepted for general use, for example, in administration of taxes, it would need to displace and replace foundational trusted systems.[157]

Nonetheless, a principle underlying blockchain, which is gaining acceptance, is its transparency.[158] Taken to its logical conclusion blockchain allows transactions relating to an item included in blockchain to be tracked back to its point of original inclusion and is open source for validation of authenticity. This may present issues in future for tax administration and/or privacy given that tax and taxpayer data is necessarily highly secure and therefore among the most attractive targets for cybercriminals.[159]

In the absence of the early adoption of new technologies to secure transactions, cybersecurity and cybercrime become increasingly significant for tax authorities to manage.[160] As their own data mining and access capability becomes more effective, cybercriminals will be seek 'access to repositories of personally identifiable information in order to facilitate financial crimes and identity theft'.[161] It will become essential for governments and trusted third parties to collaborate to deter and prevent these threats.[162]

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[152] Marco Iansiti and Karim R Lakhani, 'The Truth About Blockchain' (2017) 95(1) *Harvard Business Review Reprint* 118.

[153] Advait Deshpande et al, *Distributed Ledger Technologies/Blockchain: Challenges, Opportunities and the Prospects for Standards* (British Standards Institution Overview Report, 2017), https://www.bsigroup.com/LocalFiles/zh-tw/InfoSec-newsletter/No201706/download/BSI_Blockchain_DLT_Web.pdf.

[154] Ibid 7.

[155] Ibid 9. Iuon-Chang Lin and Tzu-Chun Liao, 'A Survey of Blockchain Security Issues and Challenges' (2017) 19(5) *International Journal of Network Security* 653.

[156] Deshpande et al, above n 153, 9.

[157] Iansiti and Lakhani, above n 152.

[158] Ibid.

[159] Lin and Liao, above n 155, 653, OECD, *Tax Challenges Arising from Digitalisation*, above n 57, 208.

[160] Commissioner of Taxation, *Annual Report 2016-17*, above n 118, 79.

[161] Australian Cyber Security Centre, *2017 Threat Report* (2017) 17, https://www.acsc.gov.au/publications/ACSC_Threat_Report_2017.pdf.

[162] S Boes and E R Leukfeldt, 'Fighting Cybercrime: A Joint Effort' in Robert M Clark and Simon Hakim (eds), *Cyber-Physical Security: Protecting Critical Infrastructure at the State and Local Level* (2017) 185.

The revenue authorities already have the most comprehensive knowledge of citizens. Combined with other government information included in the border security (passports and images), health, and social security databases, there is little information that governments do not possess. The advent of a digital age, in which data lakes, including social media, are integrated and used effectively, simply reinforces the existing requirement for security and privacy. However, the implications of system failure and data or other security breaches have exponentially greater impact.[163]

This section has analysed digital disruption of tax administration in the light of developments in technologies. It has identified issues relevant to taxpayer rights and obligations. These are explored in the next section.

5. TAXPAYER RIGHTS: ARE THE CURRENT PRINCIPLES SUFFICIENT?

The earlier discussion and analysis presages transformational change to the tax system over time. It will inevitably impact directly on how taxpayer rights and obligations are defined and implemented. However, it is questionable whether the overarching rights of taxpayers will change. This section reviews some of the more significant taxpayer rights issues that will potentially arise from change with a focus on the Australian context. For this analysis, the author's framework of taxpayer rights is used.[164] It is illustrated using Figure 1.[165] The framework for effective taxpayer rights complements the compliance framework,[166] through which the ATO builds cooperative capacity to develop willing participation by taxpayers with the tax system (responsive regulation).[167]

Figure 1 also sets out the dispute resolution mechanisms, focusing on early resolution using Alternative Dispute Resolution (ADR), with reference if required at an early stage, to the Inspector-General of Taxation (IGT). As issues become more complex the forum for resolution moves to the Administrative Appeals Tribunal (AAT) and the courts. It is only for issues significant for a broad class of taxpayers that the High Court would usually give leave to appeal. What then are some of the significant issues that will require resolution in a digital age?

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[163] This is recognised by the ATO in its own investment and through its international collaboration with governments and third parties, including the OECD. See ATO, *2017-18 Corporate Plan*, above n 73; OECD, *Technologies for Better Tax Administration: A Practical Guide for Revenue Bodies* (OECD Publishing, 2016) ch 4.

[164] See Bentley, *Taxpayers' Rights*, above n 27.

[165] Duncan Bentley, 'Taxpayer Rights in Australia Twenty Years After the Introduction of the Taxpayers' Charter' (2016) 14(2) *eJournal of Tax Research* 291, 315.

[166] John Braithwaite, 'The Essence of Responsive Regulation' (2011) 44(3) *UBC Law Review* 475; Valerie Braithwaite and John Braithwaite, 'Managing Taxation Compliance: The Evolution of the Australian Taxation Office Compliance Model' in Michael Walpole and Chris Evans (eds), *Tax Administration in the 21st Century* (Prospect Media, 2001) 215.

[167] Robert Whait, 'Let's Talk About Tax Compliance: Building Understanding and Relationships Through Discourse' (2015) 13(1) *eJournal of Tax Research* 130.

Fig. 1: Legislative Rights Framework
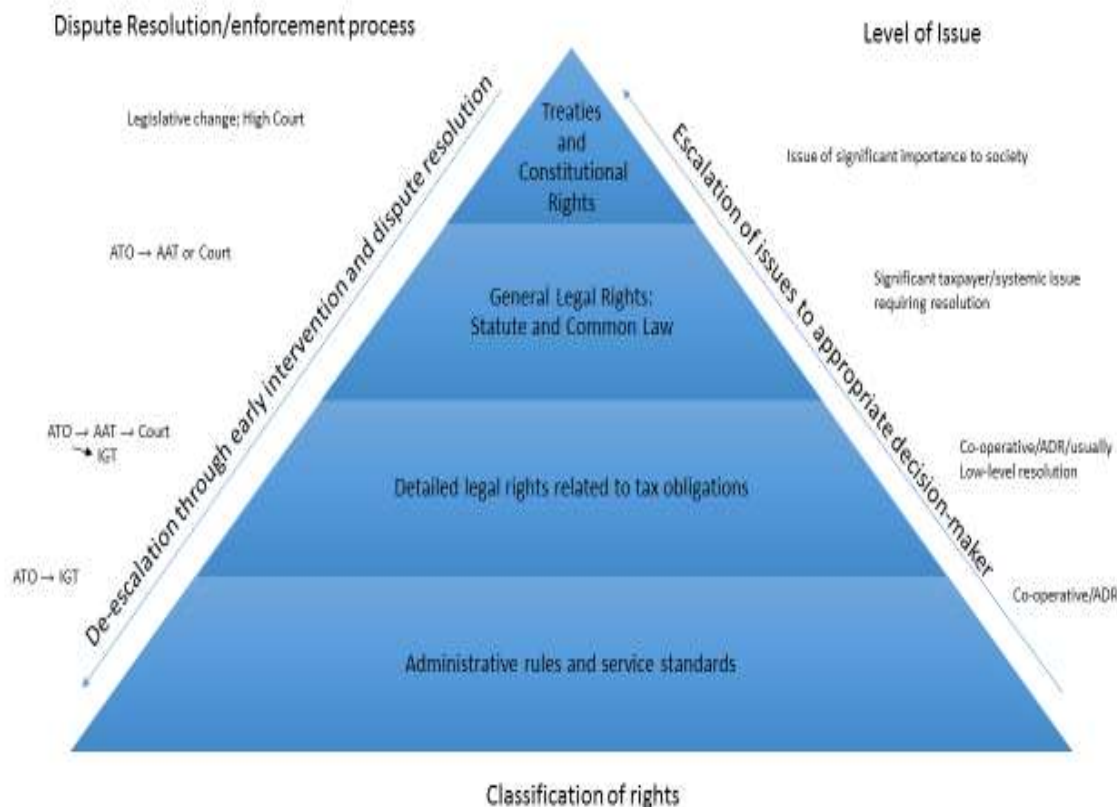
Source: Duncan Bentley, 'Taxpayer Rights in Australia Twenty Years After the Introduction of the Taxpayers' Charter' (2016) 14(2) *eJournal of Tax Research* 291, 315.

5.1   Consistency and proportionality of laws and treaty obligations

Primary legal rights articulate the fundamental principles on which a tax system is based and apply to all tax rules, whether legislative or administrative. They are normally protected by the Constitution or international treaties adopted into Australian law.[168] The Constitution is unlikely to need amendment, but treaties are likely to change or increase with the development of international collaboration. As treaties or treaty amendments are adopted into Australian law, it is vital that there is careful pre-legislative scrutiny to ensure consistency with existing and proposed Australian laws.[169]

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[168] Bentley, *Taxpayers' Rights*, above n 27, 117, 376.
[169] Ibid 155. See further Tom Campbell and Stephen Morris, 'Human Rights for Democracies: A Provisional Assessment of the *Australian Human Rights (Parliamentary Scrutiny) Act 2011*' (2015) 34(1) *University of Queensland Law Journal* 7; Alexander Horne and Andrew Le Sueur, (eds), *Parliament: Legislation and Accountability* (Hart Publishing, 2016).

As discussed above, digital transformation in areas such as information exchange and privacy will extend well beyond the tax law.

Although law does not specifically protect the principle of proportionality, it underlies policy and legislative design.[170] The principle considers proportionality in striking a fair balance between the state and taxpayers.[171] Digital rules should ensure consistency and coherence with other regulatory requirements and other forms of taxation on non-digital transactions, or they will act as a disincentive to innovation and economic development. Examples raised frequently in the BEPS consultation relate to the rules for permanent establishments, and for transfer pricing.[172]

5.2   Exercise of discretion

One of the fundamental principles applying to the tax law is the administrative exercise of discretion.[173] There are numerous decisions that the Commissioner and ATO delegated officers must make in the administration of the tax law. The *Administrative Decisions (Judicial Review) Act 1977 (Cth)* usually requires reasons for decisions, and the Taxpayers' Charter undertakes that the ATO will explain decisions made.[174] In formulating algorithms underpinning machine learning in AI, it will be important to build in sufficient transparency in any outputs to provide reasons for decisions made based on those outputs. This is not necessarily simple.[175]

AI will normally depend on human input for the initial algorithms. After that, machines can be programmed to learn through analysis and manipulation of the data held in data lakes. The large sets of data or data lakes held by the ATO are suited to machine learning. However, where an ATO decision-maker decides based on an expert interpretive framework, this is a different form of reasoning to machine learning. Machine learning identifies patterns and correlations in historic data and makes inferences based on deduction.

There is limited use of machine learning in legal decision-making yet,[176] but it is forecast to increase significantly.[177] Even then, it may be used mainly for decision-making that does not require expert interpretation, which may still be the preserve of humans.[178] The machines could be programmed to give explanations for their decisions. However, where machine learning is used, there may be biases embedded in the algorithms and in

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[170] It has been explicit or implicit in all major reviews of the Australian tax system. See, for example, Australia's Future Tax System Review Panel (Dr Ken Henry, chair), *Australia's Future Tax System, Report to the Treasurer* (December 2009) (the Henry Review) ch 2.

[171] Bentley, *Taxpayers' Rights*, above n 27, 247.

[172] OECD, *Tax Challenges Arising from Digitalisation*, above n 57.

[173] Bentley, *Taxpayers' Rights*, above n 27, 292.

[174] ATO, 'Taxpayers' Charter', https://www.ato.gov.au/about-ato/commitments-and-reporting/taxpayers--charter/.

[175] For detailed discussion in the context of the European General Data Protection Regulation, see Maja Brkan, 'Do Algorithms Rule the World? Algorithmic Decision-Making and Data Protection in the Framework of the GDPR and Beyond' (2019) *International Journal of Law and Information Technology* 1; and Sam Wrigley, 'Taming Artificial Intelligence: "Bots," the GDPR and Regulatory Approaches' in Marcello Corrales, Mark Fenswick and Nikolaus Forgó (eds), *Robotics, AI and The Future of Law* (Springer, 2018) 183.

[176] Lyria Bennett Moses and Janet Chan, 'Using Big Data for Legal and Law Enforcement Decisions: Testing the New Tools' (2014) 37(2) *University of New South Wales Law Journal* 643.

[177] Susskind and Susskind, above n 147.

[178] Bennett Moses, 'Artificial Intelligence in the Courts', above n 146, 569.

the training which are not visible without interrogation of the algorithms and programs underpinning the processes. Inferential deductions may produce decisions and the programmed explanations may well seem authentic.

For many decisions, that may be sufficient. However, as machine decision-making moves into the more complex areas of tax (and other) laws, the courts or regulators will need to determine how much transparency is required. How much transparency must the ATO build into the programming so that data analysts can undertake expert analysis to reveal flaws where there is a review of decision-making?[179] Chan and Bennett Moses discuss bias in the context of gender and race, and the concerns about predictions based on historical patterns and correlation, demonstrating that these issues will need to be explainable and transparent in decision-making using machine learning.[180]

Before we accept an AI delivered decision incorporating concepts of 'fairness' or 'reasonableness', for example, we must be sure that the machine is sufficiently sophisticated in its programming to use that concept. The research of Bennett Moses and Chan suggests that defining the boundaries between decisions supported by AI and those requiring human intervention will become critical as AI develops.[181]

It is likely that we need guidelines that determine when we entrust decisions to AI. Critical features from a rights perspective will be whether the content and matter of the discretion is significant, the binding quality or effect is substantial, or the potential application is broad.[182] Any decision must have a rationale showing that it is appropriate and necessary to achieve the objectives legitimately pursued. It must show that where there is a choice between several appropriate measures the least onerous is chosen, and where disadvantages are caused they are not disproportionate to the aims pursued. The exercise of discretion must be demonstrably fair and reasonable in matters of procedure and substance.[183]

5.3   Privacy and confidentiality

Tax administration traditionally depends on protecting confidential information.[184] The ATO must keep taxpayer information confidential except in specific circumstances.[185] The legislation allows disclosure in certain circumstances for government purposes, for law enforcement and related purposes, and for courts and tribunals.[186] The domestic provisions allow for the growing focus on information exchange under treaty arrangements to support multilateral cooperation and enforcement.[187]

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[179] Decision-making processes discussed in Janet Chan and Lyria Bennett Moses, 'Is Big Data Challenging Criminology?' (2016) 20(1) *Theoretical Criminology* 21, and the approach in US Courts analysed through *Wisconsin v Loomis*, 881 NW 2d 749 (Wis, 2016). For European General Data Protection Regulation, see Brkan, above n 175 and Wrigley, above n 175.

[180] Above n 179, discussing *Wisconsin v Loomis*, 881 NW 2d 749 (Wis, 2016) [77], [86].

[181] Bennett Moses, 'Artificial Intelligence in the Courts', above n 146; Bennett Moses and Chan, 'Using Big Data', above n 176; Chan and Bennett Moses, 'Is Big Data Challenging Criminology?', above n 179.

[182] Bentley, *Taxpayers' Rights*, above n 27, 292 and 377.

[183] Ibid.

[184] Bentley, *Taxpayers' Rights*, above n 27, ch 3.

[185] *Tax Administration Act 1953* (Cth) Sch 1, Div 355.

[186] *Tax Administration Act 1953* (Cth) Sch 1, ss 355-45 – 355-75.

[187] *Tax Administration Act 1953* (Cth) Sch 1, s 355-70 and *International Tax Agreements Act 1953* (Cth) s 23. For a comprehensive analysis, see Michael Dirkis and Brett Bondfield, 'The Developing International

While the principle that unauthorised access to, browsing of, and release of taxpayer information is fundamental in most tax administrations, a developing question is whether the extent and scope of confidentiality should change and on what basis. Transparency is a feature of the digital era as social media becomes pervasive and transparent reporting, whether regulated or voluntary, increases.

The principles of system design outlined above include security as a core principle for any system. They also include trust. As the ATO uses data lakes to develop machine learning and take advantage of AI, both security and trust will be essential to gain public approval and engagement with the systems. Although ease of access and use will build taxpayer confidence and satisfaction, a major data breach can quickly undermine trust.[188] The potential issues with blockchain that will need resolution have been discussed in section 4.3 above.

A consequential issue is the right to compensation for breach of confidentiality. WikiLeaks and release of the Panama Papers demonstrate the potential for major breaches with significant commercial consequences. Australian governments may wish to consider appropriate compensation caps or other measures to balance taxpayer rights and obligations.

The issues become more complex in determining how the privacy and confidentiality principle applies to expanded groups of third parties. The OECD notes in its 2016 publication, *Rethinking Tax Services*,[189] that most tax administrations have a combination of strategies that balance openness and governance. It provides a framework to identify,[190] on one axis, whether a tax administration prefers a closed system, focused on self-management of the core processes of tax administration, or an open system that engages a range of stakeholders. On the other axis, it identifies whether a tax administration prefers strict government control of the tax compliance services, data and information or whether these are stimulated by the market. As noted in *Tax Administration 2017*:[191]

> The advent of new technologies and service providers brings new urgency to this agenda. As tax compliance is increasingly mediated by third parties, technologies, and data in a broader tax ecosystem, tax administrations need to adopt strategies for leveraging and influencing these developments. Such strategies are likely to take the form of partnerships, with the tax administration taking more of a facilitator role rather than just acting as a traditional regulator.

While the principle of privacy and confidentiality remains the same, the issues identified here show that its meaning will start to change shape and definition. In addition, identity verification measures such as digital imaging and finger-printing are likely to develop rapidly and raise complex ethical issues. Quality assurance, standard setting, and

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Framework and Practice for the Exchange of Tax Related Information: Evolution or Change?' (2013) 11(2) *eJournal of Tax Research* 115.
[188] OECD, *Tax Administration 2017*, above n 115, 163 and see OECD, *Tax Challenges Arising from Digitalisation*, above n 57, 16.
[189] OECD, *Rethinking Tax Services: The Changing Role of Tax Service Providers in SME Tax Compliance* (OECD Publishing, 2016).
[190] Ibid Fig 5.1, 78
[191] OECD, *Tax Administration 2017*, above n 115, 68.

regulation will doubtless manage and mitigate the significant risks, but policy research should keep pace with digital implementation.

An analogous and associated issue involving both governments and third parties, is the changing nature and potential explosive growth of information exchange.[192] Assumptions of equivalence will be less easily assured, whether it involves the definitional accuracy of permissible exchange based on improved automation of translation or the nature of the underlying AI and the uses to which the information is put.[193] Although governments are working on solutions,[194] they need to be considered specifically in the tax context.[195]

5.4   Fairness

A fundamental principle of the Taxpayers' Charter is to be 'professional, responsive and fair'.[196] As discussed above, the logic and operation of AI will affect numerous elements of tax administration. For example, there is a presumption that the tax law will not discriminate between taxpayers in the same position and will allocate taxes fairly between people in different circumstances.[197] It is important that there is analysis and discussion of the biases that are embedded into the ATO's AI systems and processes and the ethical guidelines shaping their formulation.

Racism, sexism and the biases that make us human[198] become difficult to undo if the algorithms implementing AI are complex and difficult to ascertain other than from the output.[199] One of the major advantages of machine learning is that it should be possible for adjustments to be programmed into the system once biases become apparent.[200] However, at a granular level, for example, taxpayers may query how data is labelled and, if it is unclear, they may lose trust and dispute assessments. Addressing such issues early to reassure taxpayers is important to reduce negative engagement.

Much of the focus on tax audits and AI will likely be on fairness to taxpayers. However, as the ATO emphasises service and uses this to improve taxpayer compliance[201] there is another dimension that will become more important. The OECD is driving innovation in pre-filling of returns and encouraging digital innovation to eliminate returns for some

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[192] Ibid 163 and Arthur J Cockfield, 'How Countries Should Share Tax Information' (2017) 50(5) *Vanderbilt Journal of Transnational Law* 1091.

[193] Ibid 1109.

[194] See, for example, the Privacy Shield Framework developed by the US Department of Commerce, the European Commission and Swiss Administration designed to comply with the data protection requirements of the respective jurisdictions: US Department of Commerce, 'Welcome to the Privacy Shield', https://www.privacyshield.gov.

[195] Cockfield, above n 192, 1114.

[196] ATO, 'Taxpayers' Charter', above n 174.

[197] Bentley, *Taxpayers' Rights*, above n 27, 379.

[198] See, for example, Benedetto De Martino et al, 'Frames, Biases, and Rational Decision-Making in the Human Brain' (2006) 313 (5787) *Science* 684.

[199] Julia Angwin et al, 'Machine Bias' *ProPublica* (23 May 2016), available at: https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing (accessed 22 January 2019).

[200] Stefaan G Verhulst, 'Where and When AI and CI Meet: Exploring the Intersection of Artificial and Collective Intelligence Towards the Goal of Innovating How We Govern' (2018) 33(2) *AI & Society* 293.

[201] Commissioner of Taxation, *Annual Report 2016-17*, above n 118, 11.

taxpayers.[202] The ATO is improving its real-time compliance and continuous auditing capability.[203]

As digital capability and third party reporting becomes more pervasive, it is likely that the ATO will require all business transactions to be digital with real-time reporting. This and ubiquitous provision of information by citizens to governments elicits commensurate obligations on government in a democracy to use that information for the public good.

For example, taxpayers could justifiably expect that the ATO will automatically complete tax reporting for all businesses using the information collected. Businesses would then validate and approve the returns as currently happens with pre-filled returns. As a logical next step, given that most businesses are SMEs, the ATO could provide complete financial accounts based on the information collected. For many businesses they would not then need to prepare accounts separately and could simply add any missing information if required. Other ATO services for taxpayers will emerge over time.

For most businesses, this change would provide a significant cost saving, making Australian business more competitive and reducing the compliance burden on taxpayers generally. Professional and financial services will change in nature, and provide higher order expert advice, which a computer cannot provide. There will be associated productivity improvements for advisers. The pressure on the ATO to provide similar service improvements will be exacerbated by growing global trade. Once an Australian trading partner achieves these efficiencies, it is likely that business taxpayers will see it as a right they will pursue in Australia, to ensure global competitive equality.

6. CONCLUSION

Digitalisation promises to transform tax administration more rapidly than it will the tax rules themselves. How this will happen is almost impossible to predict. However, the ATO is at the forefront of changes in digital tax administration. It is piloting innovative technologies and AI in partnership with other administrations and commercial entities. Its strategy is to adopt proven solutions as quickly as possible both to improve compliance and taxpayer satisfaction.

An analysis of the systems, big data and process automation underway, and likely to eventuate, shows that the high-level principles protecting taxpayer rights remain relevant. They will help guide and shape policy review and analysis in light of real and potential change. Several areas deserve immediate attention to ensure continued protection of taxpayers:

1. The consistency, coherence and proportionality of domestic and treaty treatment of transactions in a digital world;

2. The development of guidelines for the exercise of discretion for decisions taken using machine learning capability;

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[202] OECD, *Tax Administration 2017*, above n 115, 189.
[203] ATO, 'Tax and Corporate Australia', https://www.ato.gov.au/General/Tax-and-Corporate-Australia/ and OECD, *Tax Challenges Arising from Digitalisation*, above n 57, 206.

3. The development of security and privacy guidelines for the use of AI, Cognitive Intelligence and Blockchain in the context of third-party collaboration, identity management, scale and the consequences of potential security breaches;

4. Ensuring fairness in the implementation of AI and related applications; and

5. Exploring the right to services that arise from digital compliance commensurate with the information provided to the ATO.

Digital transformation promises changes that will prove challenging for taxpayers, but the benefits are significant. Fortunately, the timeless principles of taxpayer protection and existing rights frameworks adapt seamlessly to digital disruption. There is an urgent need, however, to consider how the principles will apply to prevent the development of unnecessary gaps in taxpayer protection. It demands consideration of legal, ethical and moral issues, with proposed solutions based firmly in evidence and research.