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Tax Horizons

THE TAX TECHNOLOGY HORIZON

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About the Author

Paul Aplin was, for many years, a tax and IT partner with an independent West Country firm. In 1997 he filed the UK's first electronic self-assessment tax return and has stayed closely involved with digital developments in tax ever since. He was a member of HMRC's Carter Project Board which oversaw the implementation of Lord Carter's proposals for digitalisation of tax returns. He currently sits on HMRC's Administrative Burdens Advisory Board and the Board of the Office of Tax Simplification. A former Chair of the ICAEW Tax Faculty, he was ICAEW President in 2018/19 and now sits on the Tax Faculty Board, CIOT Council and the Tax Technology Committee of CFE. In 2009 he was appointed OBE for services to the accountancy profession and for public service.

About Tolley

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Foreword

I would like to start by thanking our author, Paul Aplin OBE, for his time, effort and expertise in writing this fascinating report. I would similarly like to thank all the contributors who have given up their time to speak to Paul, without your insights this report would not have been possible.

I am truly fascinated by the subject of tax and technology and think that in many ways it sums up a lot of what is happening in the wider world we live in. Silos are breaking down. No longer are the domains of tax advisors, financial accountants and software engineers separate but they are slowly merging into one multi-functional team. And in the same way the roles of client, adviser and the software they use are becoming increasingly intertwined. But this has not been a big bang change, where one day we have one state of being and the next another. It has been, like much of the modern world, a series of rapid iterations that over time are delivering us into a new model of working without us ever noticing much of a change. There has been a lot of talk about AI and Machine Learning over the years and a lot of people are doubtful that it will ever make much of a difference to them. But it already is doing. Receipt scanning apps on smart phones are a prime example of how technology is changing the way that the profession works for everyone. Whilst large firms and multi-nationals may have their own bespoke solutions, the wave of technological change is impacting how everyone works for the better. And as we look to the challenges of cross border taxation, digital economies and the challenge ahead of the Office of Tax Simplification, technology may just offer us the key to a system that works equitably for all.

I hope you enjoy reading this report as much as I have. It has made me very excited to see what the next series of technological iterations brings to the world of tax.

Nicholas Byrne, Market Development Director, Tolley

Introduction

We live in a world awash with data and with ever more sophisticated means to store, analyse and utilise it. Technology is transforming tax and finance functions at a pace and on a scale that is unprecedented. While tax authorities are driving part of the digital agenda (through Making Tax Digital in the UK and more broadly in ways described in the recent OECD report *Tax Administration 3.0: The Digital Transformation of Tax Administration*), technology itself is transforming the way businesses - from nano-businesses to multi-national companies (MNCs) - handle tax compliance and planning internally.

This report highlights some of the key issues that tax technology presents to businesses and their tax advisers; it looks at some of the key tools that are being employed and at some of the opportunities and challenges they bring.

Irrespective of business size or complexity, data alone is of no value. It must be cleaned, structured and interrogated to yield the information a business, tax department, tax adviser or tax authority needs. The ever-increasing volume of data makes this an ever more time-consuming process, but automation can do the heavy lifting to save time, improve insight and deploy resource more effectively.

Inevitably though, technology brings with it practical, cultural and ethical issues as well as concerns over data integrity and cyber security. Blockchain and cryptocurrencies bring other challenges. Increased demand drives increased capacity and functionality, which in turn drives even greater demand. Change is relentless and unavoidable. In the words of CFE Tax Technology Committee Chair Ian Hayes *"technology is moving faster than most people's ability to absorb change"*. Waiting to see what happens risks falling behind: The technology bus waits for no-one.

It is striking that some of the key technologies – such as optical character recognition (OCR), robotic process automation (RPA) and artificial intelligence (AI) - are being applied across the business size spectrum, from the very smallest to the biggest. Integration of finance and tax functions is another thread that runs through all business sizes. Across the board, we are seeing both evolutionary and revolutionary change.

This report concentrates mainly on the business drivers for adoption of tax technology. Insights have been provided by tax technology experts from professional services firms, in-house tax professionals, software experts and others with particular perspectives on the key issues.

Inevitably there are numerous acronyms - a glossary can be found on page 20.

The Technology Toolbox

There are a number of tools in the tax technology toolbox. They can be used independently of each other or together, but their effectiveness is inevitably dependent on the quality of information they are fed.

Optical Character Recognition (OCR) captures text from physical documents and converts it into a format suitable for machine processing. It is employed in mobile phone apps and in document scanners.

Robotic Desktop Automation (RDA) and Robotic Process Automation (RPA) are used to automate repetitive, rules-based, labour-intensive processes, saving time, reducing errors and freeing people to do more interesting and valuable work. The number of forms, extraction and validation exercises inherent in tax makes the use of RDA and RPA especially attractive. Accuracy, reliability, 24/7 availability and consistency render it ideally suited for uploading data into spreadsheets and tax software programmes from finance and enterprise resource planning (ERP) systems as well as for posting journals, completing forms, opening emails, scraping data from the web and collecting statistics. RPA is also used to transfer data captured by OCR in mobile phone apps to accounting software and to capture information from source documents for tax return preparation.

Artificial Intelligence (AI) or ***Machine Learning (ML)*** can be used alone or in combination with other tools to gain even greater data leverage. It can be used to identify patterns and to analyse and categorise complex documents. As with OCR and RPA, AI is being exploited by businesses of all sizes, whether to automatically categorise expenses in a micro-entity's records, using off the shelf software and apps, or to analyse and act on information on a global scale. It can also be used to identify patterns and outliers in datasets to help manage risk and to detect fraud. The impact of AI is explored further below, in the section Endangered Species or New Breed – the impact of AI.

Data analytics is playing an increasingly important role in tax as well as in finance functions. Data visualisation tools and Natural Language Generation (NLG) can present insight in an understandable form. Natural Language Programming (NLP) can make questions understandable by machines. Data analytics can be used for risk profiling and to identify patterns, outliers and anomalies, giving insight to both businesses and tax authorities, facilitating identification and correction of errors.

Data cleansing is the vital process of making "dirty" data clean. The value of AI and data analytics can only be as good as the quality of the data being used. Data cleansing can be an enormously time-consuming process.

Data lakes are large pools of raw data; ***data warehouses*** are repositories for processed, structured data.

Extract, Transform, Load (ETL) and ***data wrangling*** describes processes used to extract data from finance and Enterprise Resource Planning (ERP) systems and to prepare data for use in other areas such as tax.

Programming languages such as R, DAX or Python and analytics and data visualisation tools such as Power BI and Tableau have become increasingly familiar in MNC and larger practice tax departments. The insights provided, combined with predictive analysis and forecasting techniques enable businesses to plan for tax impacts more effectively than has previously been possible (or perhaps even imaginable).

Predictive analysis helps the tax function move from being reactive to being proactive, using insights to inform actions.

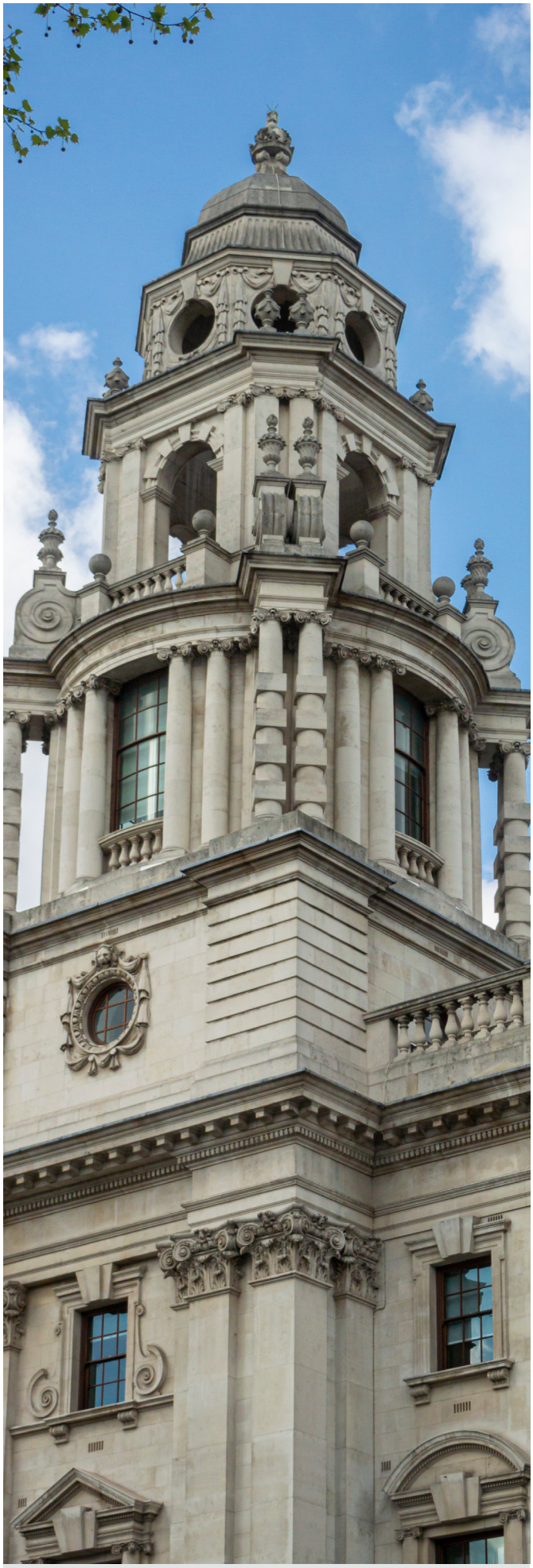
Drivers for change – Tax Authorities

While not the main focus of this report, the fact that tax administrations see great potential in digitalisation inevitably impacts on the way businesses and advisers use technology in tax processes, particularly at the reporting interface.

Tax authorities around the world are looking to digitalisation to reduce costs and improve compliance. Over the last two decades, that has mainly been through digitalisation of returns, but attention is now turning to more sophisticated use of technology. In late 2020 the OECD published *Tax Administration 3.0: The Digital Transformation of Tax Administration* which builds on the idea that *"tax administration processes are increasingly built into the natural systems used by taxpayers in their daily lives and businesses"*. The report envisages a transition from a paper-based, periodic, manual world of disconnected ecosystems to a data-driven, event-based world where real-time (or close to real-time) assured data and interoperable ecosystems enable international co-operation and where tax rules will be incorporated within business software and systems. Artificial intelligence tools and algorithms are seen as essential to support assessment of tax liabilities, decision making and personalisation.

Some trends are already well established. Digitalisation of forms and returns has become the norm in many jurisdictions. In the UK, real time (or close to real time) reporting is a feature of the PAYE RTI system and a core ambition for Making Tax Digital (MTD). Businesses of all sizes, as well as individuals, have had to adapt to digitalisation as a consequence. Some countries have made prepopulation a key element of their tax systems, using information already held by the tax authority to prepopulate individuals' tax returns, leaving the taxpayer to simply check what is presented to them. The UK has made only limited progress on prepopulation, using information obtained via the PAYE system; the ten-year tax administration strategy announced in July 2020 and the March 2021 paper *The tax administration framework: supporting a 21st century tax system* indicate an ambition to go further.

Data analytics and AI provide new ways for tax authorities to identify cases for investigation. HMRC's Connect system, for example, is a data matching and risking tool that reportedly allows cross-matching of a billion data items, identifying relationships between people, organisations and data. A wealth of information is available through the internet and social media.



Particular issues arise when businesses and individuals have to deal with multiple tax authorities (whether local or international), demanding information in different formats and at different times. This might once have been considered a problem unique to larger businesses, but even very small businesses – particularly post-Brexit - now find themselves having to deal with multiple jurisdictions. Data must be stored in a way that recognises and is responsive to these demands.

Technology facilitates e-invoicing (where an electronic copy of the sale invoice is shared in real time with the tax authority) and split payment processes (where VAT is automatically separated from sales receipts and directed to a separate dedicated bank account to cut potential VAT fraud). A number of countries have implemented e-invoicing and split-payment systems and the UK has consulted on the potential for introducing the latter.

As tax authorities pursue the agenda set out in *Tax Administration 3.0* businesses and agents will need to adapt. It is, however, important that the design of internal systems should remain primarily focused on business needs. Technology is the key to doing both.

INSIGHTS

"Technology should create a better experience for taxpayers and create more opportunities for government to develop policy that is fit for the future. The challenge is to keep people on board through this change, pointing to the benefits. One example would be the furlough scheme, which would not have been deliverable ten years ago: it was RTI that enabled it."

David Gauke, Head of Public Policy, Macfarlanes

"At present we are using technology to adapt to old models of taxation. We could instead use it to track each unique transaction and tax it automatically in real time so that corporation tax as we know it would disappear. VAT in particular could move quickly towards this model. The need to accommodate tax systems that work across borders will also drive change and open up issues such as transparency and data sharing."

Ian Hayes, Chair, CFE Tax Technology Committee

"In the context of real-time reporting, tax authorities should not apply the same thinking to transactional and non-transactional taxes: there are simply too many adjustments to make in corporate tax for this to have merit"

Ali Kennedy, Director of Group Taxation, BAE Systems

"Looking around the world there are different models for interaction between tax authorities and businesses or individuals. It is possible for sales transactions for example to be shared with tax authorities automatically and in real time. In Norway people can effectively agree the tax authority's assessment of their liability on their smartphone. The main thing is for all parties to have confidence in the technology and in the results it produces."

Paul Morton, former Tax Director of the OTS

"We need to see more carrot, less stick and to use technology to make compliance easier and less daunting for people."

Chris Downing, Director for Accountants and Bookkeepers, Sage

"Tax authorities and governments should use technology to level the playing field, to make it easier to comply and not create tech-gaps. Technology impacts large and small businesses unevenly."

Albert Fleming, Partner, Deloitte

"We need to work with tax authorities to be more specific about how technology can be used; we need more guidance on what is acceptable."

Bivek Sharma, Tax Technology and Transformation Lead, PwC

Drivers for change – Business Efficiency

Aside from the demands of tax administrations, there are other factors encouraging greater digitalisation of tax functions.

In a nano- or micro-business, tax compliance can represent a disproportionate – but unavoidable - time and cost burden. Automating the process of capturing and categorising data can help to reduce that burden. Automatic bank feeds save time by removing the need to re-key data from bank statements. Apps that can capture images of invoices with OCR, categorise them using AI and transfer the detail to accounting software via RPA again save time and facilitate real-time record keeping. Software with integrated tax functionality for VAT and direct taxes is now widely available.

The smallest businesses – and their advisers - will be reliant on out of the box solutions, many of which display a high degree of sophistication in terms of data handling, analysis, visualisation and employment of AI. Prompts, nudges and personalised information will increasingly deliver real-time support direct to the user. It is this functionality (rather than compulsion) that will convince small businesses of the value of software and apps: an automated warning that a deadline is looming and of the consequences of missing it; a prompt to confirm whether an item is business or private or to say that a specific relief is in point all hold the potential to demonstrate that software and apps can serve a proactive function that manual records cannot.

INSIGHTS

"If people see MTD just as something they have to do, that will affect the way they view software. If they see software helping them to avoid mistakes and penalties, flagging potential tax reliefs and allowances or prompting them to consider whether an expense is business or private they will view it in a positive way. But they have to see the benefit with their own eyes."

Rebecca Benneyworth MBE

In larger businesses, technology is the only realistic way to deal with the storage, categorisation and analysis of the huge volumes of data they generate; it is also the only practical way to extract information relevant for tax from the data. Deploying technology can automate routine tasks, saving time and reducing costs; it can improve information quality and provide new insight, freeing further time to focus on more productive activities and add value. Technology can manage and present data by branch, legal entity, jurisdiction or profit centre as necessary in ways that would otherwise be impossible. Data visualisation tools and predictive analysis can provide insight and support decision making.

In the past, tax was often seen as supplementary to the main finance function, a separate department taking information from ERP systems after the event and using it to make the necessary returns to tax authorities. Although most ERP systems were initially set up primarily to serve the needs of finance functions, efficiency and effectiveness are greatest where finance and tax functions are integrated, so that tax-sensitive information is recognised and correctly categorised at the very heart of enterprise systems, ideally at transaction level and in real-time.

The largest businesses will have specific needs, often necessitating bespoke data processing and analysis tools in house, while others outsource to external advisers.

Two key trends – for businesses of all sizes – can be seen. Firstly, greater integration of finance, accounting and tax functions and secondly, real time capture and recording of transactions. These trends suggest a future focused less on month end routines and more on real time insights.

INSIGHTS

"Over the past few years, we have seen digitalisation transform tax compliance for even the smallest businesses. MTD is another important step in that process. It is vital however that with each new development, businesses see something tangible in it for them in terms of greater efficiency, better insight and improved productivity."

Dame Teresa Graham DBE, Chair, HMRC Administrative Burdens Advisory Board

"Increasing use of direct bank feeds and invoices sent electronically by suppliers direct to customers means that the OCR feature of data capture apps will become less important over time."

Toby Woodhead, Head of Technology, Armstrong Watson

"We haven't seen the true power of technology and data analytics yet"

MNC Tax Technologist

"It's all about the move away from manual collection, cleansing and processing of data to more automation; away from periodic reporting to real-time insight."

Stuart Tait, Chief Technology Officer, Tax & Legal, KPMG

"Technology enables breakthroughs in data that will completely transform our advisory opportunities. A combined suite of advanced technologies like AI, RPA, and OCR, unlocks new insight whilst reimagining customer experience".

Lee Jefferson, Tax Partner, BDO

Challenges

Technology is, as we have seen, facilitating a switch from historic, periodic reporting to real-time analysis and insight. Inevitably, it brings challenges too.

It creates new questions regarding data governance and ethics. Who, for example is responsible for deciding how much reliance can be placed on AI within an organisation and how do they form that judgement? The Technology Working Group of IESBA (the International Ethics Standards Board for Accountants) is currently looking at the potential ethical impacts of technology, AI big data and data analytics.

Data security (and cybersecurity more generally) are now vital considerations in organisations, irrespective of size. Data loss, whether as a result of an internal security lapse or of a cyber-attack, can be catastrophic reputationally and have very serious consequences under GDPR. One MNC tax technologist amplified this point, saying that *"cloud and the move to real-time reporting will require more centralised data management"*.

Fintech, open banking, cryptocurrencies, distributed ledger systems (such as Blockchain) and other technologies add fresh opportunities and challenges.

Human factors such as organisational culture, willingness to embrace change and to accept and rely on insights provided by AI and data analytics can limit or enhance the potential that technology offers. Barriers to adoption can sometimes be more about the willingness of a business to accept change than its willingness to embrace technology.

INSIGHTS

"The opportunity is for tax teams to be seen as real business partners by using technology to deliver insights, evolving the tax function away from spending large amounts of time on compliance and more towards planning and informing business decisions through better use of data. That change will rely on a shift in skills, technology and culture"

Devan Mahadeshwar, Associate Partner, EY Tax Technology & Transformation team

A key limiting factor in the digitalisation of tax functions is the availability of individuals with the necessary skills (see Changing Skill Sets below).

The impact of Covid 19

The Covid 19 pandemic has acted as a major catalyst for increased adoption of technology for many businesses and practices.

Some would argue that it has been a greater driver of change than MTD. It has certainly shown the value of cloud-based solutions (enabling real-time sharing of data between business locations and between client and adviser) and has driven greater use of on-line payment channels.

The UK government sees potential to use tax data filed through quarterly reports to deliver more timely and better-targeted support to businesses in such situations (as described in *Building a Trusted, Modern Tax Administration System*, published on 21 July 2020).

While there has been greater adoption of cloud-based solutions during the pandemic, in the post-pandemic world, will the willingness to embrace technology accelerate, plateau or decline?

INSIGHTS

"What we are doing now is not sustainable but we will not go back to how we were. Long term we will settle somewhere else. The barrier that 'we cannot do this' has been removed though."

Albert Fleming, Partner, Deloitte

"There has been more willingness to adopt new technologies, and embrace technology that has now been in use for some time, such as bank feeds."

Chris Downing, Director for Accountants and Bookkeepers, Sage

"It has certainly made more people see the value of using cloud-based technology"

Toby Woodhead, Head of Technology, Armstrong Watson

"People are becoming more comfortable with relying on technology and having a more integrated approach so they can manage processes collaboratively. I think we will see silos breaking down and the lines between tax, finance and IT become more blurred where the role of technology is to help break down those barriers and drive collaboration."

Devan Mahadeshwar, Associate Partner, EY Tax

Endangered Species or New Breed – the impact of AI

In their immensely thought-provoking book "The Future of the Professions: How Technology Will Transform the Work of Human Experts", Daniel and Richard Susskind consider the effect that technology could have on the professions.

They highlight the traditional role of professionals (providing an expert, bespoke, trusted service) and set out the threats and challenges that technology brings (by automating processes, delivering insight and driving down cost expectations). A distinction is made between "sustaining" and "disruptive" technologies: the former support and enhance traditional ways of working while the latter fundamentally challenge and change working practices. While some of the technologies in this report sit in the first category, AI sits in the second.

Some years ago, the perceived threat was from expert systems: programmes that would guide a lay person with a tax question through a matrix of questions mapped to specific answers. In the event, expert systems developed more slowly than had been feared, partly because of the cost of development. AI provides a completely different approach and a different level of threat. By "learning", it can offer answers to questions, identify misanalysis and identify contentious items, disallowable costs and expenditure qualifying for specific tax reliefs (such as capital allowances and R&D reliefs).

AI is being used to assist in benchmarking for transfer pricing, automating the process of searching databases for business comparators as well as to generate intercompany trading agreements and other documentation to evidence the arrangements. It is also being employed to assist in Country-by-Country Reporting (CbCR) and DAC6 compliance.

Notices and forms can be categorised and flagged for action using AI. Material issued by governments and tax authorities can be captured and analysed in real-time, relevant information extracted and disseminated to clients and business branches globally in a way that is both timely and comprehensible, providing targeted, personalised support.

AI can be used to analyse and categorise complex documents, to sort trust deeds into categories for example or to review complex legal documentation such as SPAs for tax sensitive points, tasks that would historically have fallen to highly trained individuals. Technology is steadily transforming tax due diligence.

Relying on AI does, however, require awareness of its limitations and strengths. It needs to be trained and the effectiveness of that process depends upon the quality, quantity and variety of data from which it learns. Training AI is a resource-intensive and time-intensive task. Placing trust in AI requires either a high degree of confidence in the "black box" or a high degree of transparency, so that the process yielding the result is understood. It is important to understand the likely accuracy of the result, which will depend on the quality, volume, range and freedom from bias of data used to "train" the AI algorithms.

There is also GDPR to consider: Article 22(1) of UK GDPR limits the circumstances in which solely automated decisions that have a legal or similarly significant effect on individuals can be made.

And while AI is progressively transforming finance and tax functions, it cannot currently replace human judgement, scepticism or - to a large extent - human experience. It is, though, already established in the "expert" advisory space. Chatbots are familiar features of many websites, able to answer straightforward questions 24/7 and even to offer to connect the individual with a human adviser if they reach the limit of their stock of answers. In 2017 US tax preparers H & R Block began using IBM Watson's cognitive computing technology. Watson can analyse data, recognise patterns and understand natural language and navigate the complexities of the US tax code, enabling clients to see how their taxes were being computed while sitting alongside – rather than replacing - a tax professional.

To what extent will AI replace humans in delivering personalised tax advice and how much further can we expect self-service and tech giving access to free advice to go? The general view in discussions for this report was that while more and more information will become available at no direct cost, AI will supplement but never completely replace the advisory role.

Deloitte's Albert Fleming feels that *"In five years' time we will still be talking about it. There are not enough data points to really automate it and remove human review. If you look at autonomous cars, they have hundreds of thousands of data points being fed into them so that it can work out what to do, there just are not that many data points in tax. In five years, our work will be guided by AI but AI will not be doing the work on its own."*

Ian Hayes points to the use of AI as a tool to predict the likely outcome of tax cases *"Blue J in Canada and the USA employs machine learning and AI to predict the likely outcome of a tax case based on all previous relevant cases. Similar technology is being developed in Spain. We should watch these developments with interest – or perhaps trepidation."*

INSIGHTS

"The rise of robotic advice has to be faced"

Toby Woodhead, Head of Technology, Armstrong Watson

"AI is not coming for the tax partner's job: a complementary human/digital team is evolving. A tool that looks at changes to legislation and then flags cases where it may impact removes the obligation to have someone to trawl legislation and map to obligations."

Stuart Tait, Chief Technology Officer, Tax & Legal, KPMG

"AI can do a lot with documents such as share purchase agreements and legislation-mapping, but is probably less able to replace a person in tax at the moment. That may, of course, change in the future."

David Gauke, Head of Public Policy, Macfarlanes

"AI is already in our personal lives and it is already in our business lives - Most people don't realise they are using technology such as AI in predictive text. It needs to be transparent and trusted to get mass adoption."

Steve Cox, Head of Accountancy, Iris

Changing skill-sets – large business/large practice

Technology is having an effect on the tax skills market.

While there is still a need for separate tax and technology skill sets, there is a growing demand for tax professionals who have technology skills and for technology professionals who understand tax. As tax is increasingly integrated into ERP systems, there is also a need for tax and finance specialists to understand and deliver on each other's needs. The term "tax technologist" has been used to describe people with this tax/technology skill-set, while those who are able to offer a more holistic cross-business approach to the challenge have been described as "taxologists".

The opportunities and challenges set out in this report suggest that we need to train people not just for tax skills but to promote an awareness of technology and a willingness to look across - and move between - different disciplines within businesses. Heightened data-literacy, data management skills, awareness of data governance, ethics, critical thinking, risk management and of where responsibility for machine-led decisions falls will all be essential attributes. Far from eliminating the need for well trained professionals, technology is likely to drive demand for a new generation of tech-literate professionals who also have skills that technology cannot currently replicate or replace, such as judgement and integrity.

INSIGHTS

"Tax technologists used to focus primarily on software implementations and building software; there will always be a need for developers, but new rapid automation platforms make technology much more accessible."

Bivek Sharma, *Tax Technology and Transformation Lead, PwC*

"Tax people are used to not knowing everything but instead know what questions to ask and where to ask them: these skills help with the technology side because, just as with tax, no-one can know everything about technology. It's rare to find people who know both worlds deeply."

Albert Fleming, Partner, Deloitte

"The need is not to train tax technical people how to come up with answers by using technology but instead training them to ask the right questions of technologists."

Lee Jefferson, Tax Partner, BDO

"What the tax function needs is business analysis skills - knowing what questions need to be asked."

Stuart Tait, Chief Technology Officer, Tax & Legal, KPMG

"It is often impractical for in-house tax teams to have deep understanding of software development: the focus should be on understanding the problem, running the technology, using the data and interpreting the results."

Devan Mahadeshwar, Associate Partner, EY Tax Technology & Transformation team

Changing skill-sets – smaller business/smaller practice

Technology has transformed tax departments in professional firms of all sizes over the last quarter century.

Tax software has eliminated physical cut-and-paste tasks such as preparing income schedules and populating tax returns with the relevant totals, as well as automating computations. E-filing has become the norm. Integration of accounts and tax software has further transformed existing processes. Apps capable of capturing information from documents, digitising and automatically categorising it have become common.

While the technology solutions in this sector are more likely to be off-the-shelf software and apps, a knowledge of what is available and what it can add to the business is now vital. There is also a need for people who are both experienced in using the main brands of software and apps, but who are good at training and supporting clients in their use.

INSIGHTS

"Demand for tax technologists has not been huge - as yet. Smaller firms are looking for people who are more tech-savvy and who have good IT skills, while larger firms are seeking people with experience of process improvement and of integrating finance and tax systems."

Georgiana Head, Georgiana Head Recruitment Ltd

Simplification

Some have suggested that technology can help in the quest for tax simplification, by making it easier to navigate complex legislation.

Individuals without specialised tax knowledge are able to ask questions of - and receive answers from – technology such as chatbots in natural language. More sophisticated AI can be deployed by tax practitioners to deal with complex issues. As we have seen though, AI has limits to its potential.

It has also been suggested that technology can act as a catalyst for reform in particular areas. There are for example concerns that the tax calculations flowing from quarterly MTD ITSA reports will not be accurate unless period end adjustments such as debtors, creditors, accruals, prepayments, stock and work in progress are made; making them quarterly rather than annually, however, potentially adds a further administrative burden for smaller businesses. Simplification might include a further move towards the cash basis, or simplification of other rules; the HMRC consultation documents released in 2016 and more recently suggest a willingness to consider radical ideas that, absent MTD, might have remained unexplored.

Technology can also be used to provide prompts and nudges to improve compliance and avoid inadvertent non-compliance. Taxpayers can for example be alerted to impending deadlines – and the consequences of missing them – by such prompts. Softening and mitigating the impacts of tax law in this way can help to render complexity less of a practical concern for taxpayers: simplifying interactions, if not the law itself.

INSIGHTS

"Technology can help navigate complexity and simplify the tax experience rather than the legislation itself"

David Gauke, Head of Public Policy, Macfarlanes

"There is the concept of cognitive load. You are either going to have to use technology to cut back what you need to know or cut back what you do by either reducing the amount of legislation that needs tackling or allowing you to tackle more legislation in a shorter time period. I suspect the OTS will be more tech driven in the future and use technology to reduce the amount of law that is applicable to people."

Albert Fleming, Partner, Deloitte

"The UK has made use of data from employers via the PAYE system since 1944; we're not a country where everyone must file a tax return. There is scope for going further in capturing data from third parties or intermediaries and for making the single digital account the sole hub for communication between individuals and HMRC. We need to use technology to do more for us but without removing the responsibility for taxpayers to check that the tax return information is right. Technology can certainly help people to understand their tax position."

Bill Dodwell, Tax Director, Office of Tax Simplification

The MNC Perspective

As we have seen, the major tax technology trends in MNCs are greater integration of ERP and tax systems, the trend towards real-time recording and increasing use of data analytics and data visualisation tools to provide insight.

Tax functions are becoming less reactive and more proactive, driven by insight gained from data analytics.

A clear and convincing case has to be made for investment in technology, however, as Grant Thornton's Lee Holloway points out: *"If a process is not broken it can be hard to get the funding to change: having a really convincing case for Finance is a key hurdle. The focus needs to be on the nitty gritty of what works and adds value."* One MNC tax technologist observed that *"to get buy in you sometimes have to make something that works on a smaller scale and show what is possible".*

Cost is also an influential factor in decisions about whether to keep functions in-house or to outsource and whether to use off the shelf or bespoke solutions.

One of the most significant tax issues is the need to engage with – and satisfy the requirements of – multiple tax authorities. Technology is both the only realistic solution and a driver of demand.

While a knowledge of coding has been needed to build some in-house solutions, low-code solutions are now becoming available, allowing the assembly of software and applications from a suite of off the shelf options using a simple drag and drop approach. IBM recently launched a product enabling the creation of AI enabled RPA via a low code SaaS service.

INSIGHTS

"Even for large corporations, the move to automation can be daunting and expensive. Spreadsheets are still common. The use of technology cannot be a black box approach – it needs to be transparent so that tax directors can understand the process generating the numbers that they sign off and tax authorities can have confidence in them."

Ali Kennedy, Director of Group Taxation, BAE Systems

"Low code and rapid automation have become major trends in the US and Europe and we are seeing tax teams getting upskilled in these areas."

Bivek Sharma, Tax Technology and Transformation Lead, PwC

"We will see significant developments with Blockchain, smart contracts and cryptocurrencies. As these impact on businesses, so will they inevitably impact on tax."

Ian Hayes, Chair, CFE Tax Technology Committee

"The bit that will take it to the next level is blockchain and the automation it brings"

Steve Cox, Head of Accountancy, Iris

"In industry, I was frequently warned about the wave of technology that was about to hit us but hadn't yet"

Paul Morton, former Tax Director of the OTS

The Practice Perspective

Irrespective of client size, the essential role of the tax adviser remains the same: to facilitate compliance and to advise.

Tax compliance software has been used by most practices since the advent of Income Tax Self-Assessment in 1997. Before that, accounting packages were more common than tax packages. Over the past two decades the trend has been one of increasing integration between accounting and tax packages, with both feeding from the same data. Tax software has also automated routine tasks, freeing staff for more technical, added value work. A number of practices are now using OCR and RPA tools to capture and import information and using data analytics and data visualisation tools to give more proactive advice.

While accounting software has been a feature of the SME and larger business landscape for several decades, the last few years have seen significant change in the micro- and nano-business market. In part that change has been driven by MTD, but it has also been driven by the advent of new software products designed to cater for the needs of smaller businesses and of apps which integrate with them via APIs.

Mobile phone Apps which use OCR to capture an image of an invoice or other financial document, digitalise it, categorise it using AI and transfer it into a software package electronically have become common. As with all new technology, there has been resistance from some and enthusiasm from others. Resistance has stemmed in part from a lack of confidence in the accuracy of categorisation, but the more AI-powered apps are "trained", the more reliable they become. This technology has the potential to improve VAT and direct tax compliance by making record keeping easier, bringing it closer to real time and by integrating all the way through to tax compliance software that interfaces with HMRC via APIs.

Some still struggle with technology, but for increasing numbers of businesses and practices it is reducing costs, improving efficiency and offering greater insight and opportunities to plan. That said, the business need should always be the primary driver for using technology; better tax information will be generated as a natural by-product.

Inexpensive tax return software – some containing "what if" functionality - is now used by many individuals to complete their own returns. Free online tax planning tools are available enabling individuals to perform salary v dividend and employed v self-employed comparisons, calculations that would previously have been the preserve of tax professionals. As the functionality of such software and the sophistication of free online planning tools increases, practices will need to focus more than ever on value-added services.

Technology is making practices rethink boundaries between accounting and tax departments: as technology becomes more integrated, so to an extent will teams within firms. It is also opening up the opportunity to deliver new services. Which is of greater value to a small business, a set of accounts produced from records delivered at the last minute with the sole object of meeting a tax return filing deadline, or a cloud-based service where the adviser has 24/7 access to records and can correct misanalysis or point out that unless some bills are rendered soon, there will be a cash flow problem? Cloud technology makes a virtual FD service for the very smallest businesses a possibility that simply could not otherwise exist.

INSIGHTS

"Technology has to be looked at in a business context. A child minder client was frustrated by some parents always dropping children off early and picking up late. By linking an electronic "sign-in" diary to the accounting package they were able to charge – and be paid - for the extra time."

Rebecca Benneyworth MBE

"Tax advisory work should be insight-driven. Using data analytics and data visualisation tools such as Power BI in tandem with tax software can yield that insight, but the data has to be of consistently high quality. That is easier to achieve with corporate clients than personal tax clients where there is inevitably less consistency in the way information is presented. With personal tax clients, there is the opportunity to streamline processes using technologies such as OCR and RPA alongside AI to capture and categorise information. Developments such as open banking and Engine B can help to drive data standardisation. In a nutshell it is about using technology to be less reactive and more proactive in a real-time advisory world."

Becky Shields, Head of Digital Transformation, Moore Kingston Smith

"We are doing more with robotics and automation to make processes as cost efficient as possible."

Toby Woodhead, Head of Technology, Armstrong Watson

"Some firms are deploying chatbots to deal with routine queries and when they reach the end of their algorithms' ability to answer, the chatbot offers an appointment"

Steve Cox, Head of Accountancy, Iris

"Technology is reinforcing the advisory role of the general practitioner, who understands both commercial and tax aspects."

Chris Downing, Director for Accountants and Bookkeepers, Sage

The Software Industry Perspective

The largest businesses look to ERP solutions such as SAP, Oracle and Microsoft Dynamics, combined with niche or bespoke tax solutions.

Mid-range and smaller businesses and their advisers have a wealth of off the shelf software solutions to choose from. Over the last two decades, the trend has been away from standalone accounting, tax and practice management packages towards greater integration; away from in-house servers to cloud. Some names have stood the test of time but MTD has been the catalyst for a huge increase in the number of products available at the nano- and micro-business end of the market.

For Sage's Chris Downing, *"Businesses can be managed better if they have accurate and timely data to make informed decisions"* and that includes tax. He believes that *"The real change will come when you get real-time information that enables you to flag and react to issues in real time, spotting opportunities in the data patterns. Predictive AI is, however, better at spotting when things might go wrong than when they will go right"*

Iris's Steve Cox sees scope for increasing use of prompts in software, to avoid errors and flag opportunities and for the integration of AI and NLP so that *"instead of running a particular report by selecting it from a list, AI and NLP enable us simply to ask for it"*. Further ahead he suggests that *"AI and ML could automate the production of the tax return to the point that it actually does the return; blockchain could do away with the need for a return at all".*

Technologies such as Open Banking create new opportunities: *"untied has been using Open Banking to gather data for tax returns since 2019, and in December 2020, an untied user successfully made the UK's first MTD for Income Tax submission powered by Open Banking data. Open Banking – and Open Finance more widely - holds massive potential to transform the tax return process."* Kevin Sefton, CEO, untied

Towards the tax technology horizon

A number of themes emerge in this report, stretching out towards the tax horizon.

First, the core technologies are found across the business size spectrum, from the very smallest to the very largest businesses. Second – and again this applies irrespective of size – finance and tax functions are becoming increasingly integrated. Third, that integration is being driven in part by a move to real time recording, analysis and insight. Fourth, technology - particularly AI - is impacting on the advisory space, but augmenting rather than replacing humans. Fifth, skill sets are changing. Sixth, technology creates its own momentum: the more capacity and functionality technology has, the more we ask of it and that in turn drives even greater capacity and functionality. Seventh, change is continuous and unpredictable. Eighth, there is a trend towards cloud-based solutions. Finally, the demands of tax authorities will remain a major driver of change – but that is a subject worthy of a report in itself.

But what might we discern, through the haze, on the very limit of the horizon?

On the tax technology horizon

There are many possibilities, but three stand out.

1. This report opened with the words "we live in a world awash with data" and the theme of data quality has run through every section, as has the theme of joining up financial and tax information at source to render it useful to multiple users with minimum intervention. Common Data Models (CDMs) such as Engine B will have a major role to play here, mapping different data sets – including unstructured data and data from different finance and ERP systems – into a consistent format that can be used by multiple applications across and outside the business.
2. The possibilities created by Open Banking have not been lost on tax authorities. In December 2020 HMRC issued a formal request for information *"to fully understand the feasibility and potential uses of accessing real-time transaction data through Open Banking (OB) directly from business banking products and the application of automated tax determination, calculation and payment to HMRC…[and to explore how to]….make tax calculation frictionless for everyday business transactions"*.
3. And then of course there is Blockchain. Blockchain, as a distributed ledger system, has the potential to facilitate real-time, automated tax processes across a wide range of businesses, particularly for VAT and payroll taxes. In payroll, it could operate so that when an employer wishes to make a payment to an employee, the entry into the blockchain of the gross pay would trigger a smart contract, matching the amount with tax data to calculate the correct tax, deduct it from the amount due, pay the tax direct to the tax authority and the net pay to the employee. In a VAT context, VAT could be separated out at the point of payment with the tax going to the tax authority and the net to the business facilitating a "split payment" process.

These possibilities, like all possibilities generated by technology, bring with them new potential problems. As we have seen however, technology has already overcome many barriers and delivered functionality and solutions that a few years ago would have been deemed equally difficult.

But that is in the nature of horizons: no matter how far towards them you travel, they are always beyond reach - and the ground in between often less predictable than it appears.

A final reflection from Ian Hayes *"Tax needs technology to move into the future and it's the best tool we have to make sure our future is sound. It can free us to spend more time talking about what tax is and why it's so important."* But, as Bivek Sharma points out, the personal impacts must not be forgotten *"Technology is changing what it takes to be a tax adviser. The role will be different in ten years' time. We need to embrace this change and not be left behind….but we have to be careful about the personal impacts: technology has never made me less busy, just busy in other ways."*

Glossary

API
Application Programme Interface: the link that allows two applications, software packages or systems to "talk" to each other.

Artificial Intelligence (AI)
Technology such as machine learning, neural networks and algorithms used to replicate human cognitive characteristics, for example the ability to recognise and interpret patterns in data and to make decisions based on those patterns and on programmed or "learned" experience.

Blockchain
A digital, decentralised, distributed ledger formed from an immutable, chronological shared database of transactions.

CbCR
Country by Country Reporting

Common Data Models (CDMs)
A CDM is a system enabling the sharing of data across different applications and processes, including data analytics.

Cryptocurrencies
A form of cryptoasset designed as a means of payment. Examples include Bitcoin, Etherium and Litecoin

DAC6
EU Council Directive 2011/16, known as DAC6, introduced reporting requirements where there are cross-border tax arrangements, which meet one or more "hallmarks" and which involve either more than one EU country or an EU country and a non-EU country.

Data Analytics
The process of collecting, organising and analysing data to reveal patterns and features. ***Descriptive*** data analytics provides insight into what has happened, whereas ***predictive*** data analytics can provide insight into what is likely to happen and ***prescriptive*** data analytics into what can be made to happen.

Data Lakes
Large pools of raw data.

Data Visualisation
The process of rendering data in a visual, comprehensible form via graphs, charts and graphical representations.

Data Warehouses
Repositories for processed, structured data.

Data Wrangling
Preparation of data for loading into existing programmes.

DAX
Data Analysis Expressions (DAX) is a library of functions and operators that can be combined to build formulas and expressions in Power BI, Analysis Services, and Power Pivot in Excel data models.

Engine B
Engine B has developed a common data model (CDM) system.

Enterprise Resource Planning (ERP)
The integrated ecosystem of software that a business or organisation uses to collect, store, manage, and interpret data from its activities, generally based around an integrated database. ERP systems can be in-house, cloud-based or delivered via SaaS. Major players in this market include SAP, Oracle and Microsoft Dynamics.

Etherium
A cryptocurrency (see above)

Extract, Transform, Load (ETL)
The process of copying data from one or more sources, transforming it via cleansing or restructuring and then inserting it into a destination system, for example transferring data from accounting software or spreadsheets into tax software.

Fintech
Fintech, or "Financial Technology" refers to software and other technology - such as mobile payment technology - used to facilitate automated, modernised financial services.

GDPR
The General Data Protection Regulation.

Low code
An approach to software and application design that enables users to select and build from off the shelf building blocks.

Machine Learning
The process by which an algorithm "learns" based on experience of the data to which it is exposed. The three main types of machine learning are unsupervised (using unlabelled datasets), supervised (using labelled datasets) and reinforcement (using unlabelled data but rating output as correct or incorrect).

Natural Language Generation (NLG)
Re-rendering data in language and form understandable by humans.

Natural Language Programming (NLP)
Re-rendering human-understandable language or unstructured data in a machine-readable form.

Optical Character Recognition (OCR)
Technology that recognises text in physical documents or electronic documents such as PDFs and renders it into digital form.

Power BI
A Microsoft interactive data analytics, modelling and visualisation service which can draw on data from Excel, Google Analytics and a variety of other sources including social media platforms.

Python
A popular, powerful and easy to use programming language.

R
A programming language and environment for statistical computing and graphics.

Robotic Desktop Automation (RDA)
RDA is the application of RPA (see below) via a single user's desktop machine, restricted to the applications relevant to that individual. RPA uses robotic automation more widely within an organisation, across multiple users, departments and applications/processes.

Robotic Process Automation (RPA)
The performance of a task otherwise performed manually by a machine. RPA is especially suited to automating routine, repetitive, high volume tasks that do not require the exercise of judgement. RPA can be combined with other technologies such as AI.

SAF-T
Standard Audit File for Tax (SAF-T) is an international standard defined by the OECD for the electronic exchange of accounting data from organisations to tax authorities or external auditors.

Smart Contract
A self-executing contract within a blockchain, triggered automatically when pre-agreed conditions have been satisfied.

SaaS
Software as a service: accessing software on demand via the cloud, rather than on in-house services.

SPA
Sale and Purchase Agreement

XML
eXtensible Mark-up Language

XBRL/iXBRL
eXtensible Business Reporting Language/inline eXtensible Business Reporting Language

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