

# Chartech

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NCSC ON WORKING  
TOGETHER TO STOP  
CYBER THREATS

**EMERGING TRENDS**  
WHAT THE FUTURE  
HOLDS FOR TECH  
IN THE WORKPLACE



## CLEANING UP AUDIT

Does technology hold the key to boosting audit quality and resolving the audit crisis?



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## September/October 2018 Issue 217

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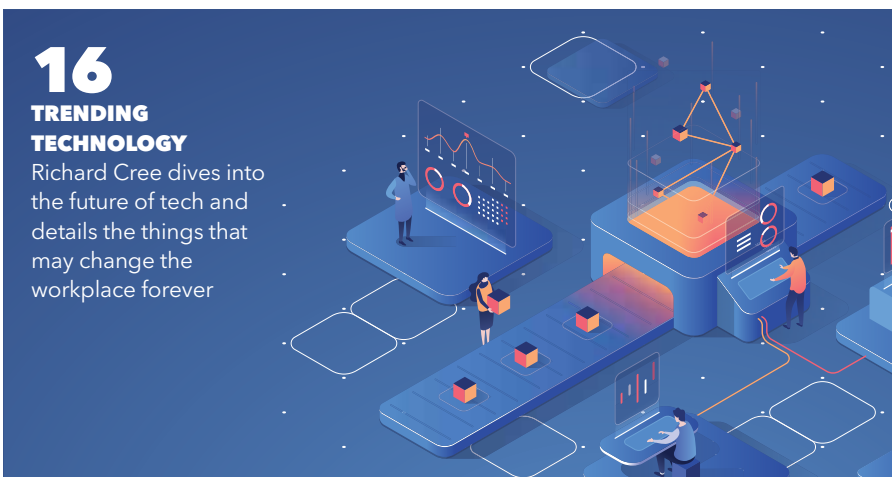
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# Revolution 4.0



*Homo sapiens* have existed for around 125,000 years. So it's miraculous that the greatest transformation of our species' fortunes have only occurred in the past 250 years.

Ever since the invention of mechanised processes that ended the reliance on hand-produced food and materials in the 1760s, humans have consistently improved upon the endeavours of those who went before them.

Since 2016, it has been suggested that we've been living in a Fourth Industrial Revolution, reaching beyond the previous limits of the Third Industrial (read: digital) Revolution of the 1970s and 80s, to explore where artificial intelligence, automation, robotics and quantum computing might lead us.

Aside from occasional expectations of a dystopian outcome (see our take on Andy Haldane's view about the future of work in an automated world on page 10), there are signs that society is broadly embracing Industry 4.0; this issue of *Chartech* is a nod in that direction.

Our cover story, looking at how technology may be a force for good in audit, examines how the latest developments might contribute to an uplift for this branch of accounting after a number of high-profile cases of business failure (page 12).

We also delve into the tech of the future with a look at eight of the most striking innovations that promise to once again change how we think about the limits of human endeavour (page 16). Making Tax Digital didn't quite make it onto the list, but we are sure members are busy getting to grips with the requirements for reporting VAT that take effect in six months' time... As ever, up-to-date details and guidance can be found on the resource page at [icaew.com/MTD](http://icaew.com/MTD)

Finally, with the protection of business and finance in mind, we have a guest article from the National Cyber Security Centre that invites readers to play an active role in creating a sharing community for cyber expertise (page 11). We hope you'll find taking part a worthwhile exercise, and shall certainly be reporting again in future about the faculty's ongoing involvement in CiSP.

**Richard Anning**  
Head of faculty

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To comment on your magazine, please email [publishing@icaew.com](mailto:publishing@icaew.com)



## IT Faculty

### Jeremy Boss Chair

T: +44 (0)7791 293 319  
E: [jeremy.boss@btinternet.com](mailto:jeremy.boss@btinternet.com)

### Nicola Granger Deputy chair

T: +44 (0)7464 652 779  
E: [nic.granger@ogauthority.co.uk](mailto:nic.granger@ogauthority.co.uk)

### Neil Christie Vice chair

T: +44 (0)1753 471943  
E: [neil.christie@iomart.com](mailto:neil.christie@iomart.com)

### Richard Anning Head of IT Faculty

T: +44 (0)20 7920 8635  
E: [richard.anning@icaew.com](mailto:richard.anning@icaew.com)

### Kirstin Gillon Technical manager

T: +44 (0)20 7920 8638  
E: [kirstin.gillon@icaew.com](mailto:kirstin.gillon@icaew.com)

### David Lyford-Smith Technical manager, IT & the profession

T: +44 (0)20 7920 8643  
E: [david.lyford-smith@icaew.com](mailto:david.lyford-smith@icaew.com)

### Mark Taylor Technical manager, technical innovation

T: +44 (0)20 7920 8476  
E: [mark.taylor@icaew.com](mailto:mark.taylor@icaew.com)

### Tracy Gray Services manager

T: +44 (0)20 7920 8526  
E: [tracy.gray@icaew.com](mailto:tracy.gray@icaew.com)

### Contact details

IT Faculty  
ICAEW  
Chartered Accountants' Hall  
Moorgate Place  
London EC2R 6EA UK  
☎ +44 (0)20 7920 8481  
✉ [itfac@icaew.com](mailto:itfac@icaew.com)  
[icaew.com/itfac](http://icaew.com/itfac)

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# NEWS & EVENTS



## TALKING TECHNOLOGY WITH THE ECA

A cross-Technical Services Department team met with senior members of the European Court of Auditors (ECA) to share ICAEW's work about technology and audit. Representatives from the IT Faculty, Audit & Assurance Faculty and Europe office met with members and ECA staff and its Foresight task force.

ICAEW presented thought leadership work around artificial intelligence and data analytics, summarised the findings of recent meetings with the large audit firms, and gave some perspectives on how audit might develop.

## VOLUNTEERS WANTED

The faculty is looking to recruit new volunteers to support its vital work at this time of technological change.

Over the past few months, the faculty has been working through changes approved by Council in March 2018, simplifying faculty governance. This will see new simpler faculty terms of reference, and the appointment of a new, smaller board in January. The existing Technical Committee is being stood down in December, to be replaced by ad hoc pop-up groups, such as the Making Tax Digital Software Advisory Group.

The Excel Community Advisory Committee has also been considering its purpose and approach, and has taken

the opportunity to reduce the size of the main Advisory Committee, while also setting up a number of satellite working groups to concentrate on specific functional areas, such as modelling, analytics and applications.

We are particularly interested in hearing from a diverse range of IT and accounting professionals (particularly younger members) who would like to join our roster of active volunteers, with a view to joining the board. In addition, we are also looking for new members in our Excel Community specifically to contribute to our new Application Group.

For more information, email Mark Taylor at [mark.taylor@icaew.com](mailto:mark.taylor@icaew.com)

## BEIS CONSULTATION

ICAEW has submitted a response to the government's consultation on automation and the future of work.

The response outlined ICAEW's commitment to remaining at the forefront of thinking as technological change takes place. But it also points out that more needs to be done to clarify for the public what's meant by automation, to stop the "clichéd association between automation and humanoid robots" taking a deeper hold.

The response stated: "The less policymakers, businesses and affected employees appreciate the applications and capabilities of automation the less they will be able to deploy it to their advantage."

ICAEW said greater efforts were needed to build skills among workers and ready businesses for economic change. The response focused on making the most of opportunities for UK business to capitalise on its strengths in technology.

[tinyurl.com/CH-2018Reps](http://tinyurl.com/CH-2018Reps)

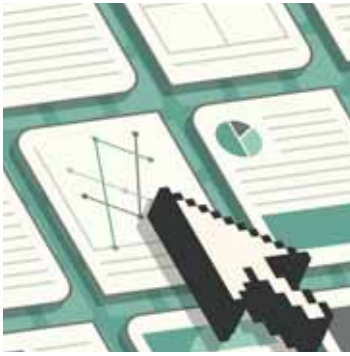
## MOVING ON WITH MTD

Our Making Tax Digital (MTD) Software Advisory Group (SAG) met over the summer to discuss progress of the MTD project. Some 35 members attended in August and discussed latest news of the pilot, timings, communications with HMRC and availability of software.

The group noted that HMRC was publishing regularly updated roadmaps for software developers and that software houses had also been more forthcoming about the availability of products. However, it was still uncertain if there would be a free product for VAT.

Members of SAG will meet HMRC to help design a software choices viewer, and will report back in due course. MTD for VAT is due to come into force in April 2019.





## FINANCIAL MODELLING

Financial modelling is done informally and formally by organisations of all kinds – mostly in spreadsheets and often without consideration of any particular way of doing things. Building on their landmark *Twenty principles for good spreadsheet practice*, the Excel Community is now taking a look at how to build financial models safely and efficiently with its forthcoming publication, the *Financial Modelling Code*.

Built from an analysis of a half a dozen methodologies and with input from every major modelling organisation, the publication is a high-level guide to best practice in the field and includes straightforward explanation of the key tenets of good practice. Its recommendations are listed alongside a variety of recommended modelling techniques for achieving them, as well as pitfalls to avoid.

The publication will be released in November at [icaew.com/financialmodelling](http://icaew.com/financialmodelling)



## IT FACULTY PROFESSIONAL DEVELOPMENT

### MAIN EVENT

#### MTD LIVE: NAVIGATING MAKING TAX DIGITAL

15 October 10:00-16:00

Chartered Accountants' Hall, London

With Making Tax Digital (MTD) for VAT just months away, this timely event is an opportunity for accountants in industry or in practice to take in the essentials. Free to all ICAEW members, registration takes place at 10:00am, for a 10:30am start, with an introduction to the digital journey HMRC is taking the nation on.

Guest speakers hosting sessions include people from Sage, Xero, ReceiptBank and BTC. Topics to be covered include using smartphones to help your business, MTD compliant software and using bank feeds.

A number of sessions are being held in the morning and the afternoon so that people don't miss out on key topics of interest. One of these sessions, 'How to choose software', is being led by IT Faculty technical manager Mark Taylor.

Following the afternoon break, there will be final sessions on preparing clients for MTD, and a panel Q&A with guest speakers.

### OTHER EVENTS

#### THE ABCD OF TECHNOLOGY FOR ACCOUNTANTS: BLOCKCHAIN

2 October 18:30-20:00

Milton Keynes

David Lyford-Smith leads this evening session, explaining our focus and current thinking around the B in our ABCD of technology - blockchain. David will outline how this distributed ledger technology could be used to better harness the power of structured and unstructured data being collected by organisations. [tinyurl.com/CH-TechForAccs](http://tinyurl.com/CH-TechForAccs)

#### PREPARE FOR DIGITAL CHANGE

Various dates, September to November

Bristol, Cheshire, Leeds and London

CABA, the ICAEW chartered accountants' support and wellbeing organisation, will discuss the impact of digital change around implementation of Making Tax Digital. Focusing on practice staff and their stress levels, this session will hone in on identifying the signs when things are getting difficult, as well as strategies for managing change. [tinyurl.com/CH-PrepChange](http://tinyurl.com/CH-PrepChange)

### WEBINARS

#### TOP 10 FUNCTIONS FOR FINANCIAL MODELLING: WHAT MIGHT CATCH YOU OUT

16 October 15:00-16:00

Liam Bastick, mathematician and director of SumProduct, shares his 30 years of experience in financial model development and audit to outline the mistakes that crop up time and again. He'll explain how these errors occur and how to avoid them. [tinyurl.com/CH-FinMod10](http://tinyurl.com/CH-FinMod10)

#### CYBER RISK FOR ACCOUNTANTS: WHAT ARE THE REAL THREATS?

24 October 13:00-14:00

Faculty technical manager Mark Taylor is joined by Liz Norris of Bluefin Professions to talk through the risk of cyber attack and its potential impact on client relationships. [tinyurl.com/CH-RealThreats](http://tinyurl.com/CH-RealThreats)



# MAKING TAX DIGITAL FOR VAT MADE EASY

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## NUMBER OF RECORDS BREACHED TO TRIPLE BY 2023

The number of records breached each year will triple in the next five years, while annual spending on cyber security will increase by an average of 9% per company, according to Juniper.

The figures came from a new report - *The Future of Cybercrime and Security: Threat Analysis, Impact Assessment & Leading Vendors 2018-2023* - which looked at the current market environment and threat landscape for cyber security.

In the year 2023 alone Juniper predicts that 33 billion records will be compromised - a 175% increase from the 12 billion that has been predicted to be stolen in 2018 - which results in a cumulative loss of over 146 billion records from now until 2023. Despite legislation such as the

General Data Protection Regulation, mandating measures to protect both personal and financial data, Juniper says the levels of spending on cyber security will remain static.

Although 99% of companies are classed as small businesses, they will only make up 13% of the cyber security market in 2018.

The report pointed out that most of these companies use consumer-grade products and spend an average of \$500 per year on cyber security.

With many of these businesses digitising, Juniper said they would be more susceptible to newer forms of malware that will require more advanced cyber security, and called for said technologies to be made available to all business regardless of size.



## BOTH WINNERS AND LOSERS AS AI AFFECTS JOB MARKET

New research from PwC suggests that artificial intelligence (AI) will create as many jobs as it displaces due to its boost to economic growth. However, there will be differences by sector, with some winners and some losers.

The firm's *UK Economic Outlook July 2018* report looked at the effects of AI on the job market between 2017 and 2037. While the overall effect might be broadly neutral, some sectors may experience dramatic changes.

For example, the healthcare sector will see the largest net increase in jobs over the next 20 years at 22%, while manufacturing (-25%), transport and storage (-22%) and public administration (-18%) see the largest long-term net decreases. Financial and insurance activities look set for a net loss of 7%.

The full report, along with sector-by-sector analysis and recommendations for government, can be downloaded at [tinyurl.com/CH-WinnersLosers](http://tinyurl.com/CH-WinnersLosers)

## GOOGLE FINED €4.34BN BY EU

Google has been fined €4.34bn by the European Commission (EC) for breach of EU antitrust rules. The EC found that Google had:

- required manufacturers to pre-install the Google Search app and Chrome web browser as a condition for licensing its app store, Google Play;
- made payments to certain large manufacturers and mobile network operators on the condition that they exclusively pre-installed the Google Search app on their devices; and
- prevented manufacturers wishing to pre-install Google

apps from selling even a single smart mobile device running on alternative versions of Android - known as 'Android forks' - that were not approved by Google. While the EC noted that Google publishes its source code online which, in principle, allows third parties to download and modify it to produce Android forks, it only covers basic features. It does not cover Google's proprietary Android apps and services that are only available by entering a contract with Google.

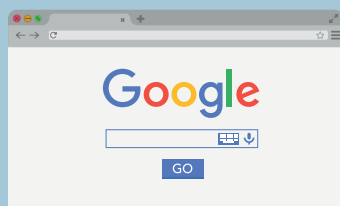
The EC said that contractual restrictions enabled Google to use Android as a "vehicle to cement the dominance of its search engine". It found Google to be dominant in the markets for general internet search services, licensable smart mobile operating systems and app stores for the Android mobile operating system.

The statement on the ruling provides detail on three separate practices aimed at cementing Google's dominant position in the general internet search.

More at [tinyurl.com/CH-Fined](http://tinyurl.com/CH-Fined)

**£3.8bn**

GOOGLE'S FINE FOR BREACHING EU ANTITRUST RULES



By Sandra Vogel  
Freelance IT writer  
[sandra@svogel.com](mailto:sandra@svogel.com)



## THE OFCOM COMMUNICATIONS MARKET REPORT 2018

Since 2004, the UK's communications regulator Ofcom has annually published its *Communications Market Report*. Over the years, the report has shown Britain's attitude towards technology, as well as how it is used. The 2018 report takes a look at how things have changed, as well as laying out how things are today. It covers the whole range of communications technologies from TV and radio to the internet and phones.

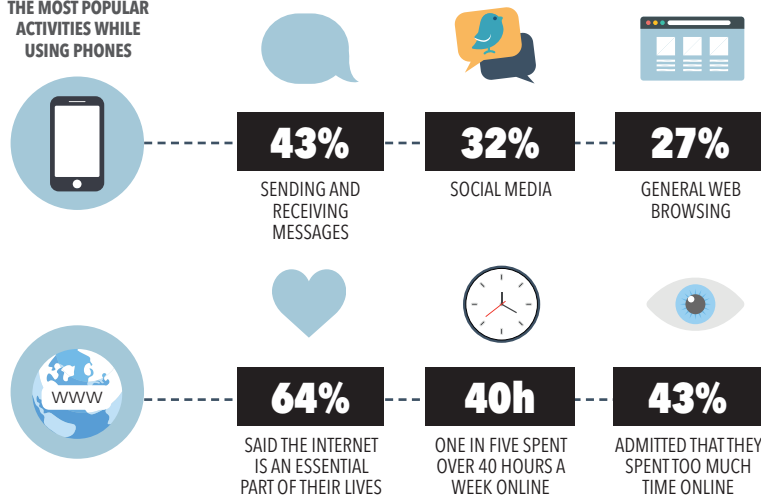
According to the report, Britons now spend one day a week online - twice the amount of time spent in 2011. When it comes to the use of phones, the most popular activities were sending and receiving messages (43%), using social media (32%) and general web browsing (27%). Figures also showed that people

checked their phones once every 12 minutes of the waking day on average. Meanwhile, two-fifths (40%) said they checked their phones within five minutes of waking up, with under-35s being the most likely to do so at 65%. Most respondents acknowledged the benefit to staying online, with three-quarters (75%) saying it helped them maintain personal relationships.

When it comes to the internet, 64% said it was an essential part of their lives, with one in five spending more than 40 hours a week online. Just over two in five (43%) admitted that they spent too much time online.

There is much more detail in the report, as well as some interesting historical comparisons. You can learn more by visiting [tinyurl.com/CH-CMR2018](http://tinyurl.com/CH-CMR2018)

### THE MOST POPULAR ACTIVITIES WHILE USING PHONES



## NEW DRONE LAWS FOR THE UK

New rules governing the use of drones came into effect in the UK in July.

Under the new laws, drones cannot be flown above 400ft or within a kilometre of airport boundaries. The Civil Aviation Authority (CAA) and airports will be able to make exceptions to these restrictions.

From 30 November 2019, owners of drones that are 250g or more will have to register with the CAA and drone pilots will need to take an online safety test. Drone operators will also eventually be required to use apps, allowing them to access the information needed to make sure any planned flight can be made safely and legally.

Flouting the height and airport boundary restrictions could result in an unlimited fine, up to five years in prison, or both. Those who fail to register or sit the competency tests could face fines of up to £1,000.

If you have an interest in drones keep an eye out for the Drone (Regulation) Bill 2017-19, which should be published before the end of the year. It was originally due this summer, so it may even have been published by the time you read this.



## GOVERNMENT DOCUMENTS LEAKED VIA TRELLO

An investigation by the *Sunday Telegraph* discovered hundreds of Cabinet Office, Home Office and NHS documents were accidentally leaked online through the co-working and information sharing application Trello.

According to the investigation, the leaks happened because users had made workspaces - called 'boards' - public rather than the default private setting. Public boards are indexed by Google and can be searched.

Following the revelation, others have undertaken further investigations. Computer security specialist Brian Krebs has written about some examples on his website ([tinyurl.com/CH-KrebBlog](http://tinyurl.com/CH-KrebBlog)), suggesting the problem is quite widespread.

Readers using Trello or similar services need to be aware of how protected data is used on these platforms.

You can read more about the *Telegraph* investigation at [tinyurl.com/CH-TelTrello](http://tinyurl.com/CH-TelTrello)



# BRINGING AI INTO FOCUS

Doom-laden tales of how artificial intelligence will affect accountancy resurface every time the subject hits the headlines. But the positives deserve a regular mention too

Back in August, Bank of England chief economist Andy Haldane shared his views on how artificial intelligence (AI) might affect long-term future employment in the UK. Naturally, the media was keen to pick up on the negatives.

Speaking on Radio 4's *Today* programme, Haldane was quizzed in relation to the popularly-used statistic that up to 50% of existing jobs could become automated by 2055 - and mentioned that accountancy was considered to have a 95% risk of being partly automated. He referred to 300 years of history, and the "lengthy and wrenching" effects the first three industrial revolutions had had on those who struggled when jobs were made obsolete by machinery. Moreover, he added that the effects of the fourth - and current - technological revolution had the potential to be as "large as that of the first three", only this time the machines could think as well as do. So far, so bleak.

## RIDING OUT THE STORM

Buried in with the gloom were slivers of hope in Haldane's interview, and that chimed with the stance ICAEW has taken in the five years since Oxford academics Michael Osborne and Carl Frey listed a set of professions in danger of automation (including accountancy).

Rather than burying its head however, accountancy as a profession has been embracing the change and working out how businesses and individuals can adapt. While it may be one of the most often cited professions on the danger list, it could be argued that accountancy is one of the best placed to ride out any storm.

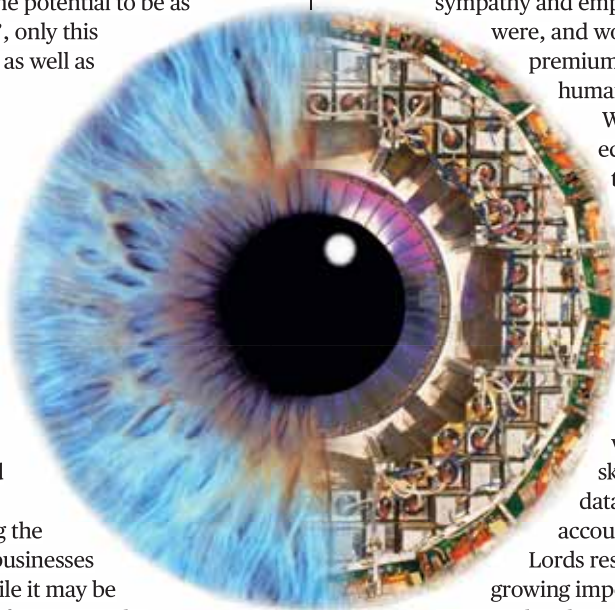
Haldane said the scale of societal change around future employment must be measured against two factors: how many jobs are likely to be displaced, and the number of new jobs that would be created as a result of any transformation. ICAEW has long been focused on the positive aspects that AI can bring to accountancy. In its response to the House of Lords' call for evidence on AI a year ago, it stated its belief that "humans will continue to find many ways to contribute to economies and societies, alongside machines", and implored policymakers to think about how society could

mitigate negative factors likely to emerge as a result of job loss through automation. ICAEW stated: "It is very likely that AI will lead to significant changes in the skills demanded by employers."

It added that younger generations particularly would need to develop skills that enabled them to work effectively with specialists, and do the technical and analytical work that will become central to business. This is crucial if society is to avoid what Haldane called "technological unemployment", whereby vacancies would remain unfilled and people lacked the skills to take them. ICAEW said there would need to be greater emphasis on "uniquely human skills" that complement computers, like empathy. Haldane agreed with this view, mentioning "those social skills of sympathy and empathy and negotiation" that were, and would largely remain, at a huge premium because "we like speaking to human beings".

While Haldane told the BBC's economics editor Kamal Ahmed that humans would remain most important in areas such as personal care, ICAEW also sees clear parallels with these attributes and those that the 'trusted adviser' of the future will need - a role that accountants are increasingly stepping into. As well as highlighting the new skills in reading and analysing data that are already emerging in accountancy, ICAEW's House of Lords response emphasised the growing importance of having good "personal and professional skills such as critical thinking and communication". Haldane thought that human judgement would remain important in complex decision-making environments where data crunching was handed over to machine.

It's great to see AI moving up the news agenda. Hearing from the likes of Haldane will be increasingly important in explaining what AI is and how it can transform business. As a profession we should also try to avoid undue panic: even as accountancy embraces the power of machine learning to sift and process vast quantities of data, AI is still in the early stages of mainstream adoption. It will be interesting to see how well AI delivers on its early promise. ●



# A PART TO PLAY

The **National Cyber Security Centre** explains the importance of government and industry working together to reduce the impact of cyber threats to the UK

As the government's lead technical authority on cyber security, the National Cyber Security Centre's (NCSC's) mission is to make the UK the safest place to live and do business online. Accountancy firms are vital to the UK's economic wellbeing and a priority sector for NCSC engagement. Like all businesses, chartered accountants depend on IT systems that protect sensitive client information and safeguard the processing of valuable funds. However, sophisticated cyber criminals are fully aware of the precious data you hold and will do everything they can to gain access to it. That's why it's imperative we all work together to reduce the future impact of cyber attacks.

## A CRITICAL PARTNERSHIP

The NCSC's partnership with ICAEW and its members is critical to our understanding of the cyber security challenges you face. Earlier this year we launched the ICAEW Chartered Accountants group on our Cyber information Sharing Partnership (CiSP) platform ([ncsc.gov.uk/cisp](https://ncsc.gov.uk/cisp)) - a joint industry and government initiative. This dedicated forum allows ICAEW members to share information about cyber threats and best practice in real time and in a secure environment, thereby improving business resilience.

Firms from across the accountancy sector can also draw on the wealth of NCSC guidance, designed to defend you and your clients from malicious cyber activity. NCSC's Small Business Guide ([ncsc.gov.uk/smallbusiness](https://ncsc.gov.uk/smallbusiness)) and

the Cyber Essentials Assurances Scheme ([cyberessentials.ncsc.gov.uk](https://cyberessentials.ncsc.gov.uk)) outline simple, practical steps that could save you time, money and even your business's reputation. This guidance is equally important for your supply chain or anyone else that you need to disclose sensitive information to.

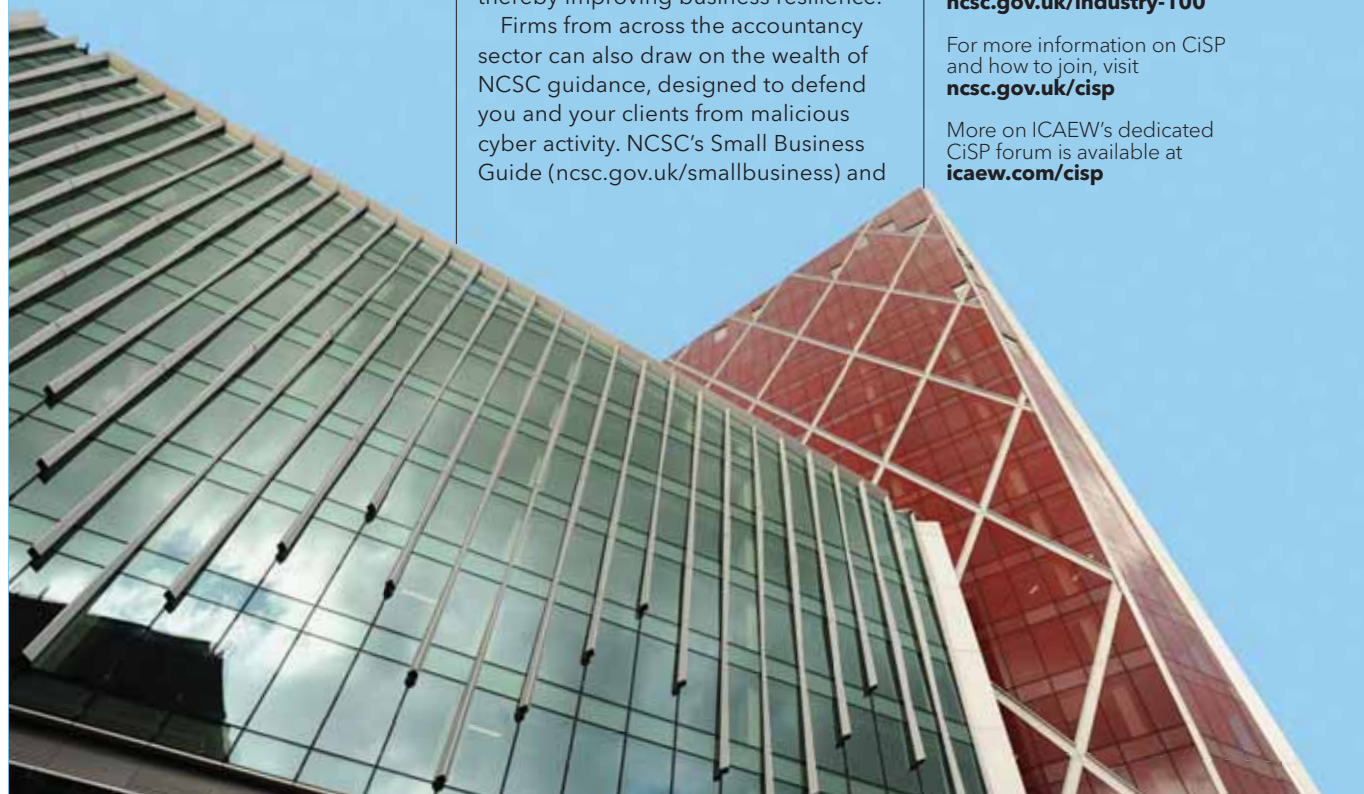
## THE i100 INITIATIVE

The NCSC is very keen to talk chartered accountancy firms to discuss how we can better collaborate to meet the cyber challenges of today and tomorrow. Our Industry 100 initiative (i100) brings together industry and government expertise to challenge thinking, test innovative ideas and shape our offer to priority sectors. Well into its second year, i100 has a thriving community but we want more collaboration to grow that community even further. You can contact [i100@ncsc.gov.uk](mailto:i100@ncsc.gov.uk) for more information or if you have any questions. ●

For the latest news and information about i100, head to [ncsc.gov.uk/industry-100](https://ncsc.gov.uk/industry-100)

For more information on CiSP and how to join, visit [ncsc.gov.uk/cisp](https://ncsc.gov.uk/cisp)

More on ICAEW's dedicated CiSP forum is available at [icaew.com/cisp](https://icaew.com/cisp)



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# CRISIS MANAGEMENT

Can technology boost audit quality and solve the crisis in the audit profession? Lesley Meall explores some possibilities

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Audit is in crisis - again - but this time it may be existential. "It's a watershed moment. If we don't fix this, I don't think we'll have a profession in 20 years' time," commented Michael Izza, ICAEW chief executive, earlier this year when the UK parliament issued its final report into the collapse of Carillion. Perspectives on the exact nature of the crisis in audit, reasons for it and possible solutions all vary widely across the very many stakeholder groups - understandably. Even members of the accountancy profession, including auditors, hold diverse opinions.

Blame is placed on internal and external auditors, company boards and management, regulators, politicians, Big Four dominance, company complexity, the intricacies of standards for audit and financial reporting and erosion of the institutional trust model. Suggested remedies include: break up of the Big Four; audit-only firms; assurance of the entire annual report; greater powers and resources for regulators at the Financial Reporting Council (FRC); separate entities for standard-setting and enforcement; abolition of the FRC; technology; and the distributed trust model technology can enable.

## REVISITING THE PAST

If you have a sense of *déjà vu*, it may be because we have been here before - or at least somewhere nearby. In the quest for audit quality, almost all of these matters (and more) have been carefully considered (and acted upon) by experts at the European Commission, UK Competition and Markets Authority, Financial Conduct Authority and the FRC. However, as the wheels of change tend to turn slowly in policymaking, regulation and standard-setting, while technology advances at a fast and furious pace, perhaps it's time to look more closely at how this can improve audit quality.

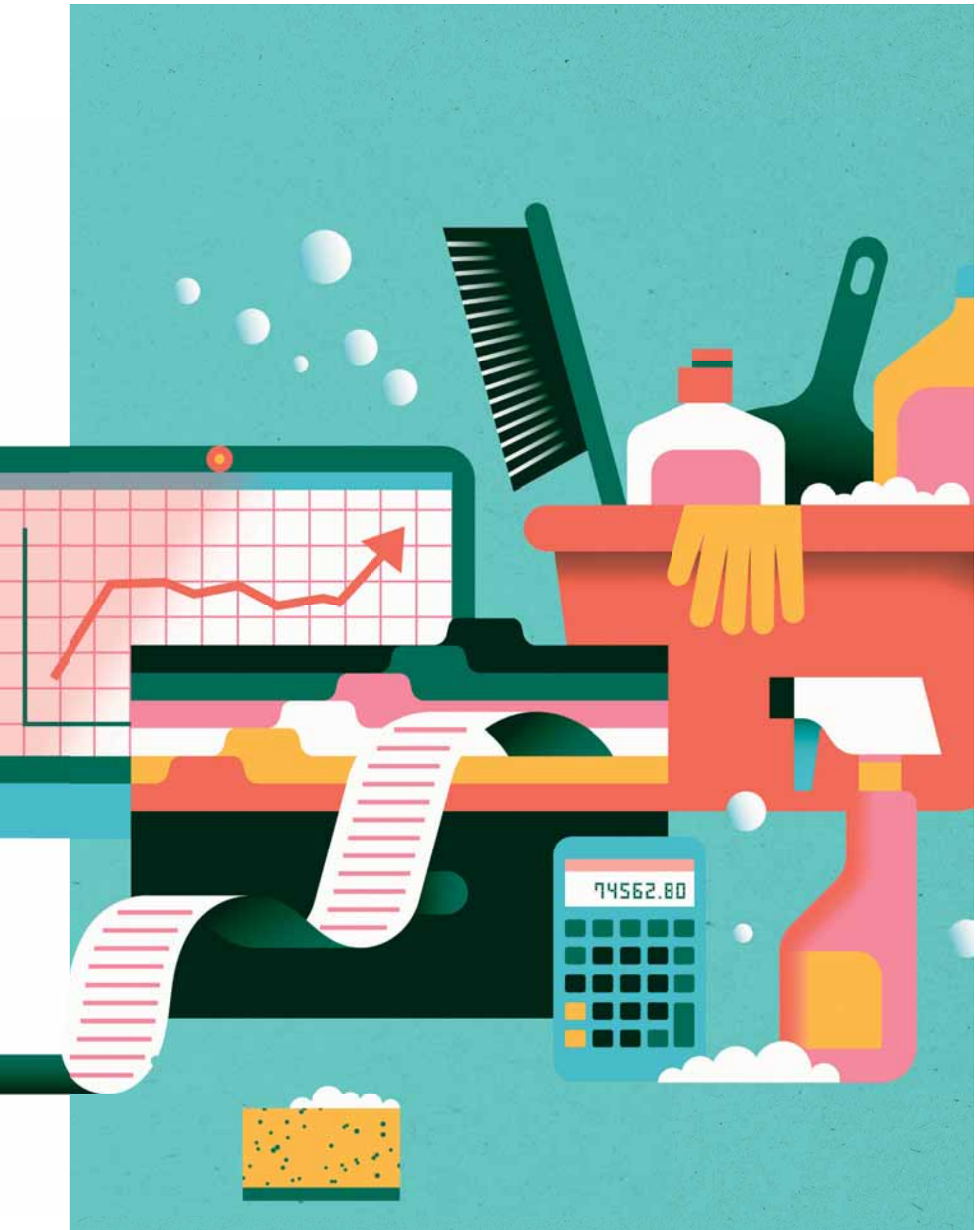
Precedents exist. "Firms of all sizes use technology in some shape or form to enhance their

audit approach," says Lesley Clarke, senior manager, professional standards, ICAEW. Use of software applications for accounts production and audit automation is commonplace and has already delivered benefits. Some firms are using audit data analytics to enhance audit quality; some are considering this; some are exploring the potential to boost audit quality with cutting-edge tools that exploit artificial intelligence (AI) and blockchain.

Alex Peal, head of audit and assurance at James Cowper Kreston, has been exploring audit data analytics for the past couple of years and he has shared the firm's experiences with ICAEW (at [tinyurl.com/CH-TechEss](http://tinyurl.com/CH-TechEss) and [icaew.com/aafwebinars](http://icaew.com/aafwebinars)). So far, however, audit automation software has had the biggest positive impact on the firm's audits. "We switched from traditional paper files and hand-written schedules over a decade ago, because we wanted to make sure that everyone in the firm worked on a consistent basis with a set methodology for doing things," explains Peal. This consistency feeds into audit quality.

An electronic system can make it easier for a firm and individual auditors to stay on top of relevant regulations and standards for financial reporting and International Standards on Auditing (ISAs) and help it to follow developments in best practice. "If you get new or revised ISAs or a new Companies Act, that can be more easily updated across the board, you know that everyone is using the right version and doing things in the way they are meant to be done," says Peal. Using audit automation tools to better record and address risks can also enhance audit quality.

Paul Freeman, IT director at Ormerod Rutter (which uses CCH Audit Automation) picks up the theme. "In terms of quality, the framework enforced by the audit software has allowed us not only to better record risks but has also ensured that risks are addressed in an appropriate and consistent manner."





Ormerod Rutter used to start with the entire audit pack and pare this down, subject to the risks that the team discovered. Now it takes almost the opposite approach to the process.

### **MIXED BLESSINGS**

"We start with the essentials and build up the audit approach based on the risks that are discovered. This has resulted in a far more focused and higher quality audit," says Freeman. Because Ormerod Rutter uses CCH Accounts Production too, connectivity between this and the audit automation software also feeds into audit quality. "Integration between the solutions has improved the flow of data both ways, eliminating inefficiency and removing transposition errors," he says - and improved the quality and efficiency of the functions these systems automate.

Although such tools can (and do) enhance audit quality, they do not guarantee this. If a software application is kept up to date to reflect developments such as the arrival of new auditing or financial reporting standards (like FRS 102) and the changes have been appropriately implemented, then its use can justifiably reinforce a firm's confidence that its auditors are consistently on top of relevant regulations and standards. If not, overdependence on software can have a negative impact on audit quality.

"Firms have used accounting software for many years. It is an invaluable tool, helping to ensure that

presentation and disclosure within financial statements complies with requirements, but care is needed not to over-rely on it," says Clarke. Errors in coding of base data or ticking the wrong box can easily lead to errors or omissions in outputs, which in turn may have a negative impact on the quality of audit. Deciding how much trust to place in a software application or service is one of the many judgement calls that auditors must make.

"Firms should always make sure they are familiar with reporting and disclosure requirements and should robustly review the output," says Clarke. ICAEW's *Audit Monitoring 2018* report ([tinyurl.com/CH-RegArea](https://tinyurl.com/CH-RegArea)) notes that "some firms place too much reliance on their software, and blame it for not picking up errors and omissions". It also notes that firms are more likely to identify errors and omissions if they make good use of disclosure checklists. For example, customising them for individual clients and certain types of audit can contribute to audit quality.

Over the past decade or so, many professions have embraced technology as a route to greater efficiencies and enhanced quality. Now that technology is starting to fundamentally reshape what is possible in business - and audit - expectations are shifting. Volumes of digital data are growing exponentially and the speed at which some technologies are emerging, advancing and being adopted by companies (that are audit entities) is accelerating. Approaches to technology (and its use) by those in the audit ecosystem will need to evolve to match this.

"We are seeing clients with ever more complex finance systems and ever increasing data volumes. It is often no longer feasible to get the evidence needed in an audit through the use of manual tests alone. Technology and audit software tools have to be utilised to address this challenge," says Matthew Campbell, technology audit director at KPMG. Audit data analytics software enables auditors to analyse huge populations of data and test every item, to better understand clients' businesses and systems - and associated risks. "Auditors can focus on the higher risk items and therefore deliver a higher quality audit."

Automating routine tests in the audit process also allows auditors to spend more time on the judgemental areas that require the application of professional judgement when reaching audit conclusions. "Predictive analytics allows auditors to independently challenge management's assumptions in areas of judgement - such as forecasting and future views on profitability or cash flows - bringing quality and depth to the challenge of management," says Campbell. Data analytics can be used to independently recalculate complex modelling or calculations performed by the client entity.

### **ASSESSING THE POSSIBILITIES**

"We see increasing use of data analytics across the profession," says Mike Suffield, the FRC's acting executive director for audit and actuarial regulation. There are large scale bespoke analytics with over a

thousand hours of dedicated development time and standard tools and techniques being rolled out across entire practices, creating opportunities and challenges for the UK audit regulator and standard setter. "Anecdotally, it appears that such tools are contributing to audit quality. Now the use of these techniques are scaling up, we are considering potential metrics that would enable us to assess this," Suffield adds.

The FRC is not yet seeing the use of cognitive tools, machine learning and other manifestations of AI, according to Suffield, but it is aware of firms investing and innovating in this area. Kingston Smith, for example, has spent around two years experimenting with Ai Auditor, a platform developed by fintech firm MindBridge. It's a tool for sampling journals: all general ledger transactions go through the AI; it does completeness tests on the data; ranks all transactions on the basis of risk; then selects a sample. It's a fast learner.

Kingston Smith began exploring AI for its audit efficiency potential, but Ai Auditor can enhance efficiency and audit quality. It learns from weightings its users apply to risk factors to improve its ability to identify "normal" and "risky" transactions. "You need to be sceptical about the output and test it, not accept it at face value," says Karen Wardell, a Kingston Smith partner who shares insight in *The essential guide to audit tech* ([tinyurl.com/CH-TechEss](https://tinyurl.com/CH-TechEss)). AI sampling could be more robust than random samples selected by audit team members.

"Advances in audit offer exciting new ways of performing audits," says Suffield, and the FRC reviews what firms are doing and its own skills to keep its inspections and inspectors informed. "We continue to augment our cadre of specialist IT audit inspectors and general inspectors. A couple of years ago we issued our thematic review of data analytics use in financial statement audits, confirming our view of the potential to improve audit quality. We aim to refresh that exercise in 2019 to take account of more recent developments."

The potential for technology to enhance audit quality can emerge from some unexpected places. Increased focus on data protection during preparations for the EU General Data Protection Regulation gave MHA MacIntyre Hudson better insights into technology in all sorts of areas (see *Chartech* at [tinyurl.com/CH-HelpHin](https://tinyurl.com/CH-HelpHin)) and expanded one partner's perspective on the kind of evidence the firm should be looking for during audits.

**"We are seeing clients with ever more complex finance systems and ever increasing data volumes. It is often no longer feasible to get the evidence needed in an audit through the use of manual tests"**

"As an auditor I think that every time we go out and audit now, we should be asking to see the data breach register," says Andrew Moyser, the MHA MacIntyre Hudson partner who is also the firm's data protection officer. "Auditors should be asking whether affected audit entities have a data breach register and looking to see what's on it," he says. Given the potential financial and reputational costs of data breaches, data protection measures down the supply chain could also merit closer scrutiny. Though such concerns (and even horror stories like Carillion) may become less of a problem in the future.

A blockchain-based system is being developed with the potential to boost audit quality and reshape the audit and assurance ecosystem. Auditchain is a "decentralised continuous audit reporting protocol ecosystem for enterprise assurance, reporting and disclosure". Some of you may need to read that more than once before the words gel into something meaningful. Some of you may already be heading for [auditchain.com](https://auditchain.com) to learn more about it. Some of you may want to revisit [icaew.com/blockchain](https://icaew.com/blockchain) to brush up on crypto-transactions or distributed ledgers.

#### THE FUTURE OF ASSURANCE

Jason Meyers, founder and chair of the company, positions Auditchain as "a foundation on which products (such as enterprise resource planning systems and analytics) and services (such as audit) will be made interoperable". According to Auditchain, its ecosystem can enable 100% population testing; immutable records of transactions; real-time streaming of financial statements and contemporaneous audit opinions, reports and analysis; and it disrupts the existing business model for audit by changing how it is funded and how auditors are engaged and compensated.

Audit stakeholders contribute part of the assurance costs by purchasing subscriptions to enterprise financial and control data through Auditchain. The more detail subscribers demand, the more they pay for it. Premium levels of assurance can be requested and paid for (using tokens) by enterprises through a library of engagement contracts, rather than continued use of single enterprise/auditor engagements. "Decentralised consensus-based attestation for a reward is how crypto-transactions are validated on most public blockchains. Auditchain will make this possible for enterprise data sets," says Meyers.

Technology has already enabled a distributed trust model to disrupt industries like hotels (Airbnb) and taxis (Uber). Why would the ecosystem around financial and non-financial reporting, disclosure and assurance be immune? Meyers says: "Auditor adoption of the network can lead to greater independence and increased operational efficiencies within the assurance industry, giving a wide range of auditor selection for decentralised enterprise assurance and allowing larger audit firms to focus on other areas of consulting." Perhaps the crisis in audit isn't existential after all. ●



# EXPLORING EMERGING TRENDS

What is the Internet of Thinking? Heard of dark data? How about extended reality? Richard Cree considers what technology in the workplace will look like in future





It's hard to imagine now, but it was not long ago that only a handful of people were able to talk with any clarity about concepts such as big data, the Internet of Things, cloud computing and cyber security. These ideas have rapidly moved into the mainstream reality of everyday business conversation. So what are the emerging ideas and the potential future issues that will be on boardroom agendas in the years ahead?

## 01

### CONVERSATIONAL INTERFACES

The phrase "investing in new conversational interfaces" sounds like horrendous marketing babble for simply talking to people, but the interfaces in question are not with people. This is tech talk, not marketing speak, and it refers primarily to the continued rise of voice-activated technology.

Early voice activation technology was inconsistent, as anyone who used early voice controls in their car can testify. But machines are learning and voice recognition software is getting much better. With more devices than ever now equipped with virtual assistants such as Alexa and Siri, conversational interfaces are moving out of what the Gartner hype cycle describes as the valley of despair and into the centre of our tech lives.

HMRC is piloting voice as part of its security measures (as anyone who has found themselves saying the phrase "my voice is my password" down the phone will confirm). The key to genuine conversational interface technology is that real conversations are two-way and the next step is for voice activation to be enhanced by powerful artificial intelligence (AI). This will allow machine learning and other technologies behind the voices to get better at predicting not only correct responses to questions, but also how to start conversations based on the pattern of previous behaviours and exchanges.

## 02

### INTERNET OF THINKING

The explosion in the quality and quantity of AI, with the former being driven by the latter (as investment leads to advances and improvements), means we are edging ever closer to the moment of so-called singularity. This is the point that plays a

## The key to genuine conversational interface technology is that real conversations are two-way and the next step is for voice activation to be enhanced by powerful artificial intelligence

crucial part in anti-technology creed of the techno conspiracy theorists - the moment machines form a super intelligence and, working together, start to take over the world. Hopefully there will be a window of bliss before the end of days, when the ability of connected devices to think for themselves will meet some social need.

Welcome to the Internet of Thinking, an expansion of the existing idea of the Internet of Things, except now the things in question are able to predict each other's information needs and combine in new ways to build non-human neural connections. Automation in driving, for instance, requires intelligent, autonomous vehicles, but also digital roads and a highly connected infrastructure that can properly control and manage interactions on the road. The Internet of Thinking is the technology that will help the Internet of Things finally deliver its full potential.

## 03

### TWO-DIMENSIONAL TECHNOLOGY

Even if you haven't heard the term two-dimensional technology, it is likely you have heard of the discovery that's driving the trend. In 2004, graphene was confirmed as a real, rather than hypothetical, material. This opened up endless possibilities for new developments. It is regarded by many as the kind of miracle material that could result in breakthroughs that solve some major world problems. At the University of Manchester, where the Nobel Prize-winning discovery was made, they believe the only limit to the possibilities of graphene is our collective imagination.

A form of single-atom carbon, with the

layer of atoms organised in a hexagonal structure, it has so many properties it is bewildering. Lighter even than other forms of carbon, it is also stronger than steel, electrically and thermally conductive and yet transparent. It can be water resistant or super absorbing.

Graphene has the potential to transform everything from electric cars (with smaller, lighter batteries chargeable in minutes) to smartphones. It could lead to laptops or tablets screens you can fold or roll up. Graphene-based fabrics are creating a new generation of smart clothes capable of cooling or heating the wearer by storing and transferring body heat, while two-dimensional transistors and super capacitors are capable of disrupting every sector and product category. It may sound distinctly old-fashioned, but the future is distinctly two-dimensional.

## 04

### BIO-STORAGE

Nothing to do with keeping hazardous chemicals safe, this kind of bio-storage refers to the use of DNA as a potential refuge for the vast quantities of digital data that modern life is generating. In nature, DNA is little more than a mechanism to store vast quantities of essential information in something tiny. As our digital lives get ever more data hungry, the search for ways to store more data in a smaller space led scientists to look at how to replicate the way DNA stores genetic information and using it to store movies or other digital data instead.

The idea has been continually tested and challenged with steadily improving results after an early success in 2010. If the statistics and claims accompanying this research are even half right - and there is no reason to doubt them - no wonder so much effort is going into this research. The density of DNA storage means current estimates claim that every film ever made could be stored on a sugar lump-sized piece of DNA. Meanwhile, others claim that all the world's data - if stored on DNA - would fit into the back of a car. This moves us into new territory that current storage techniques would never match.

So what's the drawback? Unfortunately the instability of the system means you can't always retrieve the data in one piece. And while confidence in the ease of retrieval is growing, it is still no match



## 2004

THE YEAR GRAPHENE WAS DISCOVERED AT THE UNIVERSITY OF MANCHESTER

for traditional storage methods. It also remains horrendously expensive for now, although as more work is done the price is coming down rapidly.

## 05

### DATA VERACITY

The issue of being able to safely and securely store lots of confidential data and be sure that it will be easily retrieved without interference is prevalent in another new major trend. Data veracity refers to the need for businesses to be able to know beyond all doubt that data is not only accurate, but that it is also unbiased and hasn't been tampered with.

Election rigging, for example, used to mean boots on the ground as people physically interfered with ballot papers



## Technology will literally shift the boundaries between the real and the virtual, and machine learning will make it harder to determine where the old lines are and where they have blurred

or even spread dirt about candidates at local hustings. Now data does the damage and those wishing to interfere can - and they are usually thousands of miles away. Many businesses face similar challenges. They have to be able to verify that data and any insights they offer based on that data is 100% wholesome and accurate, as data is being manipulated like never before.

### 06

#### EXTENDED REALITY

We have had augmented and virtual reality - both of which will continue to thrive across more areas of life as hardware and software both improves and gets cheaper, lowering the barriers currently stopping most people trying them. But immersive experiences are

changing how we connect with people, information and experiences.

Shopping at the moment is characterised as either faceless and online (via a website or app) or real world and social (at a physical shop). But in the future, new technologies will allow home shoppers to virtually try on clothes, match them with existing wardrobe items and even discuss combinations and fit with a “shop assistant” (who may be an algorithm, a chatbot or a real person located thousands of miles away).

The same goes for accountancy, where the current choice between a software package or high street accountant may eventually become moot. Technology will literally shift the boundaries between the real and the virtual, and machine learning will make it harder to determine where the old lines are and where they have blurred.

### 07

#### QUANTUM COMPUTING

Though it's not exactly a new idea, quantum computing must rate as one of the most popular emerging tech trends on the verge of hitting the mainstream. It is frequently name-checked as the future of computing, although few people really understand exactly how it works. Indeed, despite huge organisations (IBM and Google) investing vast sums in research into quantum computing - in the race for what Google has dubbed quantum supremacy - it is still an open question whether it is possible to build a quantum computer that is stable enough for long enough to actually do anything useful.

For those who only need the essentials, the promise of quantum computing is, well, a quantum leap forward in processing power and a new generation of supercomputers able to make complex calculations currently beyond even the most powerful conventional processor. Whereas traditional bits are single pieces of data stored as ones or zeros, quantum computing relies on so-called qubits, which are able to hold more data than just one or zero, because they can exist in any superposition of these values. Having made some fairly public boasts about its ability in this arena, Google continues to pour significant sums into quantum computing. That alone suggests potential solutions to the stability problems could be as quick as they would be dramatic.

### 08

#### DARK DATA

Another on the fringe of mainstream consciousness, dark data doesn't refer to anything sinister and is unrelated to the concept of the dark web - the alternative internet universe where criminals gather to buy and sell illicit materials and information. Rather it refers to information collected by businesses in the course of everyday activities but that is not utilised for any other business purpose. Thus information required for compliance purposes may be gathered by an organisation but not used at all to help drive sales or other business insights or decision-making. Dark data is significant because it leads to organisations unwillingly or unwittingly adding risk, expense or both to their business way beyond any value they derive from the data. ●

# SEEKING DATA VALIDATION

**Simon Hurst** explains how to use Data Validation and hierarchical lists together

Using a source list for Data Validation cells is one of the easiest ways to allow a user to select an item from a dropdown list. Sometimes it will be necessary to make the choices available in one Data Validation cell depending on the choice already made in another such cell. A common way to achieve this is to use Range Names and the INDIRECT() function to select from a list of names in one cell and then use that name as the list source for the other Data Validation cell.

The topic was covered recently in the Excel Community. In his Modelling 101 series ([tinyurl.com/CH-Modelling101](http://tinyurl.com/CH-Modelling101)), Liam Bastick covered a range of Excel functions that could be used when working with dynamic ranges, including OFFSET(), CHOOSE() and INDIRECT(). This article was also the inspiration for a later article covering an alternative approach using Power Query ([tinyurl.com/CH-PowerQuery](http://tinyurl.com/CH-PowerQuery)).

Here, we are going to build on both of these approaches to address a specific application of dependent lists: the ability to limit one list to the items that belong to a particular category in another list. We will be using nominal account codes for our example and showing how we could make it easier to create formatted reports by restricting the choices of accounts

according to the particular section of the report that we are working with. The approach could be used to work with a range of other accounting issues from choosing product types and options through to staff planning.

## ACCOUNTS BY CATEGORY

Two years ago, a two-part series in *Chartech* focused on using Power Query to create a formatted profit and loss account by consolidating data from multiple workbooks. As part of this process, an accounts chart was used to allocate individual nominal accounts to reporting headings (Figure 1).

We could allocate our categories to individual account codes by using the approximate form of the Excel VLOOKUP() or MATCH() functions or by merging a trial balance with our code chart Table using Power Query and the ability to Fill Down values.

The process was covered in the November/December 2016 issue of *Chartech*. Whichever method you use, the result should be something like this (Figure 2).

## DEPENDENT ACCOUNT LIST

If we were creating our accounts report and wanted to include specific accounts from the Cost of sales section, it would be useful to restrict our Data Validation source to the accounts in that section only. When working with Excel Tables and Data Validation, it's a good idea to allocate a Range Name to the column that you want to use as the Data Validation source. This is because a Data Validation source based directly on the cells in an entire Excel Table column will only adjust automatically if the Data Validation cell and Excel Table are on the same worksheet.

Using a Range Name based on the entire Table column allows the Data Validation source to adjust whichever worksheet it is on. We could allocate the Range Name:

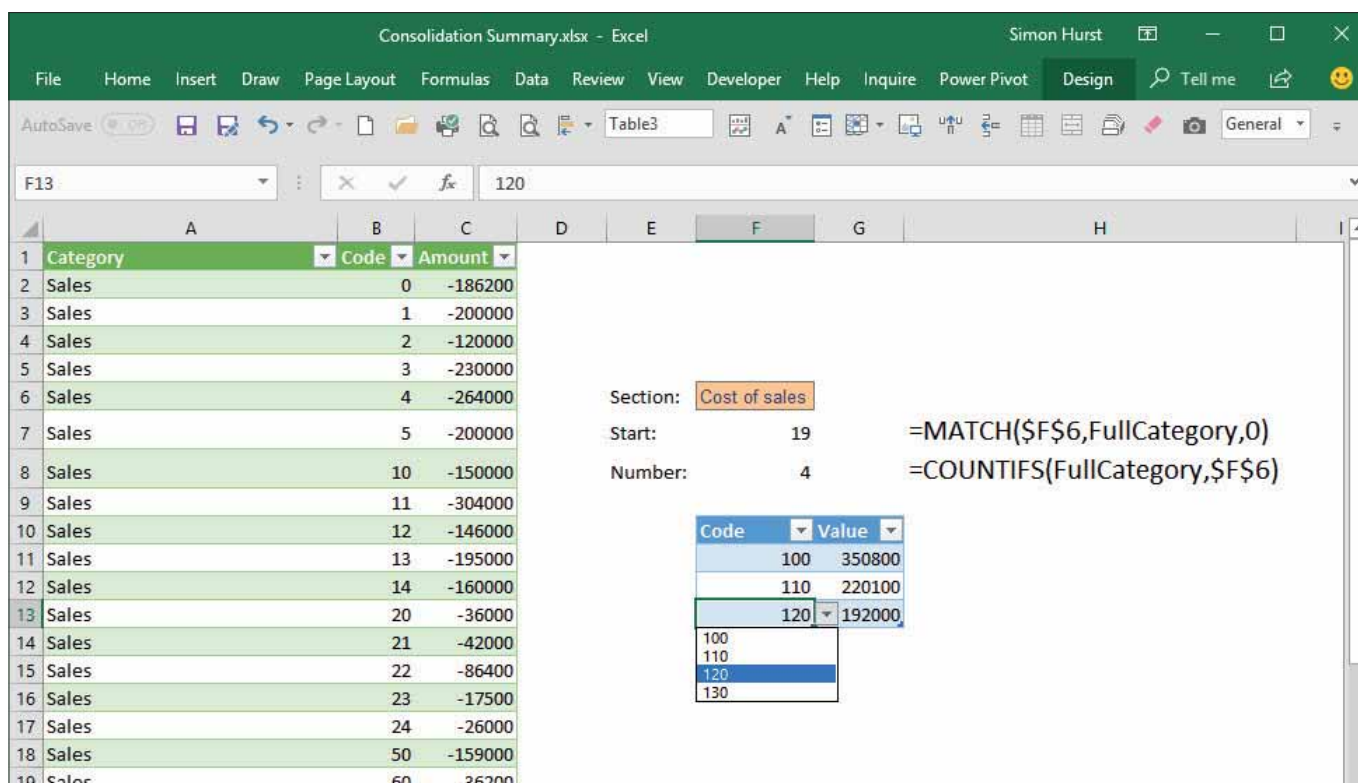


Figure 3

Category to the Category column of our accounts chart Table and then use this Range Name as the List source for our top-level Data Validation cell. Once we have chosen a value from this list, we want our dependent Data Validation cells to only show nominal accounts in this section of our coding chart.

Having chosen our category, we can find the first cell in the Category column of our full list of account codes and values that matches the Category using the MATCH() function. We can also find out how many cells in the Category column match the category using COUNTIF() or COUNTIFS(). We have allocated the Range Name: FullCategory to the Category column of our full list of account codes and values.

In the example below, we have included our Table and 'report' on the same sheet so that we can see how it all works. In practice, we would keep the Table containing the data and the report cells on separate sheets. The Data Validation source of cell F6 is set to the Category Range Name from our accounts chart Table. We can use the value selected in this cell to find the first matching item in our FullCategory list and also the number of matching items. For the approach to work, our Table must be sorted by Category so that all the individual accounts in a category are together.

The Data Validation List source for the Code column of our accounts Table is entered as:

=OFFSET(FullCategory,\$F\$7-1,1,\$F\$8,1)

We are using the 'area' version of OFFSET() to return a range rather than a single cell. Setting our first argument as a range means that OFFSET() will use the top left cell of that range as its starting point. We then use arguments two and three to move us to the first Cost of sales entry and one column to the right respectively. Arguments three and four define an area as many rows high as the number of Cost of sales matches and one column wide (Figure 3).

Although we have shown the various values in separate cells for clarity, we could combine them into a single Data Validation source formula: =OFFSET(FullCategory,MATCH(\$F\$6,FullCategory,0)-1,1,COUNTIFS(FullCategory,\$F\$6),1)

For more information on the OFFSET() function, including some of the drawbacks of using this particular function, it's worth searching the Excel Community where you will find over 30 relevant results: [tinyurl.com/CH-OffsetFunction](http://tinyurl.com/CH-OffsetFunction) ●

### OTHER OFFICE TIPS

The Excel Community site includes many articles on Excel and other software. In addition, there is a forum where you can ask, and answer, questions on a wide range of Excel issues: [tinyurl.com/CH-ExcelCommunity](http://tinyurl.com/CH-ExcelCommunity)

The IT Counts site includes articles of more general interest including office software and hardware, IT security, management reporting and cloud computing. It too has a forum: [tinyurl.com/CH-ITCounts](http://tinyurl.com/CH-ITCounts)

Simon's book, *Essential Excel for Accountants* (and others) is available as a PDF at [tinyurl.com/CH-EssEx](http://tinyurl.com/CH-EssEx)

There are also useful Excel tips in the 'Lunchtime Learning' section of Simon's website at [tinyurl.com/CH-Lunch](http://tinyurl.com/CH-Lunch)

Code	Category
0	Sales
100	Cost of sales
200	Rent and rates
230	Professional fees
240	Insurance
260	Printing, postage and stationery
270	Advertising
280	Telephone and communications
320	Motor and travel
340	Bank charges and interest
380	General expenses
400	Depreciation
500	Financial

Figure 1

Category	Code	Amount
Sales	0	-186200
Sales	1	-200000
Sales	2	-120000
Sales	3	-230000
Sales	4	-264000
Sales	5	-200000
Sales	10	-150000
Sales	11	-304000
Sales	12	-146000
Sales	13	-195000
Sales	14	-160000
Sales	20	-36000
Sales	21	-42000
Sales	22	-86400
Sales	23	-17500
Sales	24	-26000
Sales	50	-159000
Sales	60	-36200
Cost of sales	100	350800
Cost of sales	110	220100
Cost of sales	120	192000
Cost of sales	130	210000
Rent and rates	200	120000
Rent and rates	210	112000
Rent and rates	220	26000
Professional fees	230	7000
Insurance	240	0
Insurance	250	4600
Printing, postage and stationery	260	15800
Advertising	270	6900
Telephone and communications	300	3400

Figure 2



LEO WALDOCK

Deep down, I am certain the Internet of Things (IoT) is inevitable. In time, every device that contains a silicon chip and a power source will sprout wireless connectivity. This means that your fridge will only have to make a hop and a step to your Wi-Fi router or smartphone and onward to the cloud to create your next grocery shopping list. It should be a similar story for printer suppliers, where you keep spare toner cartridges on the shelf that are only charged to your account when installed in a printer.

The sooner that businesses can do away with keys, light switches and air conditioning controls the better, provided the systems work correctly and intelligently. In my opinion, a key test for IoT will be the end of stock takes, as inventory should be tracked in real time down to the smallest item and the very last penny.

### TOO MANY CHOICES

The massive range of systems that might fall under the heading of IoT can be confusing, so on one hand, I can control the lighting in my house from my smartphone. On the other hand, cars - probably electric and self-driving - will mesh together to provide continuously updated maps of traffic, road repairs and weather.

Getting your hands on a solid example of the IoT is a great help, and this recently happened when I bought a new electric toothbrush, which caused me to take a step back and rethink a few things.

A couple of years ago I bought an electric toothbrush fitted with a small LCD display that connected with the toothbrush via Bluetooth. The display times how long you have brushed your teeth and doubles as a clock for the bathroom, which is handy.

I recently decided the toothbrush was looking battered and careworn and that it

## BRUSH IT OFF

My new intelligent toothbrush illustrates the dark side of the Internet of Things

**The sooner that businesses can do away with keys, light switches and air conditioning controls the better, provided the systems work correctly**

was time to get another. I wasn't looking for an upgrade or a change, so I bought the same make and model and received a toothbrush that looked very similar to the original, only this time the Bluetooth display was not included.

My new toothbrush cannot connect to the original Bluetooth display I own, and as a result, I am obliged to use their app to connect the device to my smartphone if I want a report about my teeth-brushing prowess. The app is also needed if I want to control the RGB - red, green, blue - LED lighting that has been added for no particular reason.

I strongly dislike the way the app demands permission to take photos and videos that can be transmitted back to their HQ so the toothbrush manufacturer can gain feedback about the way I use their product. While I see their point, I draw the line at anyone transmitting photos and videos from my bathroom.

In more general terms, IoT should make life easier, cheaper and better. It should be intelligent. Apps are fairly inevitable but it seems lazy to offer the paying customer the ability to change the colour of a light while Big Brother wants to slurp their data in return.

I would probably be fine with a point-to-point Bluetooth connection between my smartphone and the device, but once you add the ability to transmit data back to base it becomes a problem.

For example, you want the manufacturer of your security system to check that the locks, cameras and sensors are working correctly, but do you want them tracking the locations of your staff members in real time and logging which face gets into which car at the end of the working day? Of course not, it's none of their business. ●

Leo Waldock, freelance IT writer

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Official fuel consumption for the new Volvo XC40 range in MPG (l/100km): Urban 30.4 (9.3) – 52.3 (5.4), Extra Urban 47.1 (6.0) – 64.2 (4.4), Combined 39.2 (7.2) – 58.9 (4.8). CO<sub>2</sub> emissions 168 – 127g/km. MPG figures are obtained from laboratory testing intended for comparisons between vehicles and may not reflect real driving results.