Intelligent finance

Making technology work for the public sector

CIPFA\ The Chartered Institute of
Public Finance & Accountancy

PF Perspectives

This is the eighth in a series of *PF Perspectives,* produced by CIPFA and *Public Finance.* They are designed to stimulate discussion on key public finance and policy issues. These essays, by leading public sector practitioners and experts, examine how digital technology is transforming public financial management and the delivery of public services

CONTENTS

F ORE WOR D

ROB WHITEMAN
*Chief executive of
CIPFA*

Know your blockchain from your big data? Up to speed with predictive analytics and AI?

Judging from recent surveys, much of the public sector is still in the analogue age. CIPFA has found that, in the UK, only 58% of public service organisations have a digital strategy. Worldwide, the OECD reports that new technologies such as blockchain are either misunderstood or ignored.

Yet digital transformation has never been more critical for the sector. Everything from medical diagnostics to supply chains, procurement and payment systems is being disrupted by the fourth industrial revolution. The pace of change in the wider economy – and society at large – means everyone needs to up their technological game.

Nowhere is this more important than in relation to the finance function. As local government minister Rishi Sunak argues in this edition of *PF Perspectives*, local authorities can make serious savings by wholeheartedly embracing the new tech. Other authors explain how the application of machine learning and cloud-based technology is already transforming service delivery. This is not just important for public finance professionals and for the bottom line. It empowers patients, welfare recipients and housing tenants, who receive more efficient, joined-up services as a result.

Of course, the benefits of the digital revolution can be overstated, and the risks and ethical challenges downplayed. Predictive analytics, for example, could be a gamechanger for cash-strapped councils trying to grapple with complex issues such as child abuse risk. Equally, algorithmic profiling could be a data information nightmare because of its potential to intrude on people's private lives.

A succession of data breaches – from ransomware attacks on the NHS to the Cambridge Analytica scandal to the latest Facebook hack – highlight how seriously cybersecurity and counter-fraud need to be taken.

Then there's the issue of 'offline' service-users – many older and disabled people, among others, for whom digitised services are not always such welcome news.

In the essays collected here, government and industry experts take a deep dive into these controversial issues, weighing up the benefits of the tech revolution against the governance challenges they present.

How should the finance function define its place in this brave new digital world? How can CFOs play a leading, proactive role in digital transformation across public services?

These are urgent, exciting questions thrown up by the extraordinary speed of technological change – but one conclusion is incontrovertible. Those in charge of public financial management must rise to the challenge and get with the programme. Literally.

CONTRIBUTORS

**ROB
WHITEMAN**

Rob Whiteman is
CIPFA's chief executive.
He previously led the
UK Border Agency
and the IDeA, and
was chief executive
at Barking and
Dagenham Council

**RISHI
SUNAK**

Rishi Sunak is MP for
Richmond and the
minister for local
government. Before
entering Parliament he
spent his career in
business and finance,
working internationally

**MATTHEW
TAYLOR**

Matthew Taylor has
been chief executive of
the RSA since November
2006. Previously he was
chief political adviser to
the prime minister, and
chief executive of the
IPPR think-tank

**CHRISTINA
THOMPSON**

Christina Thompson is
director of finance and
property at the London
borough of Lambeth. She
has over 20 years'
experience as a finance
professional in local
government and health

**MAX
TSE**

Max Tse is an executive
leader at the National
Audit Office, with
oversight of digital
transformation.
Previously he led
the DWP's value for
money audit

**GRACE
MA**

Grace Ma is programme
manager at the fintech
company AID:Tech.
She has worked
extensively with
early-stage startups in
the blockchain and
cryptocurrency industry

**CLARE
GARDINER**

Clare Gardiner is director
of engagement at the
National Cyber Security
Centre. She previously
led on cyber and digital
security issues for the
British Embassy in
Washington DC

**BRUCE
DAVIS**

Bruce Davis is joint
managing director of
Abundance Investment,
which crowdfunds green
and social investments
in the UK. He is also
visiting research fellow
at the Bauman Institute

**MARC
MCAULEY**

Marc Mcauley is CIPFA's
counter fraud manager
and has extensive
experience of fraud
management, risk
assessment and using
innovative solutions for
effective fraud detection

**JUNE
MATTE**

June Matte is managing
director and chief
executive of PFM
Advisors UK, an
independent financial
advisory firm serving
local government and
the university sector

BRAVE NEW FINANCE

The digital blueprint

ESSAY

BY RISHI SUNAK

The government is committed to helping council leaders create agile digital services that serve citizens and bring down costs

Rishi Sunak MP *is the minister for local government*

EVERY DAY, we use electronic devices to make our lives run more smoothly. Smartphones put a collection of formerly separate functions in the palms of our hands. Large numbers of us go without an alarm clock, A-Z street map, CD player, newspaper, train or bus timetable, shopping catalogue, phone book or address book – one digital device can do it all.

The latest technological developments are taking things even further. Smartwatches can monitor our health – plotting our running routes, blood pressure and heart rate changes – to keep us on track and let us know how our bodies are doing. Cutting edge research is even raising the prospect of a watch that can spot the early warning signs of illness.

As minister for local government, I firmly believe a line can be drawn between technology's impact on us and the positive impact that councils have on so many. We couldn't go without the work of councils in key services, whether it's bin collections, care for the elderly or road repairs – like technology, they are a fundamental part of our day-to-day lives. Tech and public services, together, have the potential to revolutionise public services for all.

The vision

Local authorities that embrace new tech could also save millions of pounds. I launched the Local Government Digital Declaration in July 2018, along with the new £7.5m Local Digital Fund, to help local authorities deliver technological transformation.

It was launched in the knowledge that councils are already thinking hard about how they can transform services. Fabulous work is happening up and down the country, and the creativity and innovation coming from the sector is enormously impressive. From Sheffield to Essex and from Barking and Dagenham to Dorset, councils are using data analytics to understand complex social issues and develop predictive models that help them intervene earlier. These councils have learned to work across internal boundaries and with external partners by piloting new thinking and creating insight hubs on particularly pressing issues.

Bristol, Hackney, and Adur and Worthing have all designed housing repair services based on user research in order to meet tenants' needs more quickly, efficiently and cheaply. However, they all spent time and money doing it in isolation, each coming up with similar insights and digital services. I want to save everyone from having to do this on their own. I want to see us working together to solve problems.

This will require a new approach to leadership – conversations about digital are not just for the people running council IT departments, but also for the people running councils. Today, digital transformation is as much an issue for the boardroom as it is for the basement.

My department has been working with leaders across local government, the Local Government Association, Solace and the Government Digital Service to develop a programme for boosting capacity and capability at all levels. I have been particularly keen to talk to council leadership, as it is the leadership that creates the space within which the confidence of digital practitioners, user researchers and designers can flourish.

Council leaders set the tone that encourages officers to explore new models, understand how technology can speed things up, target resources more effectively and free up staff to focus on the parts of their jobs that add the most value. And, yes, to take a few risks along the way.

What good looks like

Senior leaders across local government need to understand enough about data and digital technology to make effective decisions in the internet age. They need to know how the shape of public services can change and what 'good' digital transformation looks like. To get there, they have to experience well-designed, agile digital services.

Consequently, we are developing a leadership development programme that will pay for 1,000 officers to develop their skills and capacities. Some of these will be IT professionals becoming even better at what they do, but I also want to see senior leaders – councillors, chief executives, finance directors – enhancing their skills and knowledge to help build the authorities of the future.

There is a two-stage application process for the Local Digital Fund, which will invite local authorities and central government organisations to bid for money. We're currently processing expressions of interest received since 24 September. This stage has been designed to enable the team at the Ministry of Housing, Communities and Local Government to match up similar ideas being put forward by different councils. By putting councils in touch with each other, we aim to encourage shared and complementary bids. During the second phase, which started on 15 October, promising applicants are being invited to submit full applications.

Declaration of intent

The Declaration brings renewed focus to the ways councils, when working as a collective group of innovators in vital public services, can embrace the possibilities of technology together. First, it sets out how we should focus relentlessly on the needs of our citizens. Second, it gives a blueprint for fixing what I call our 'digital plumbing' – ensuring that one council's work on solving an issue is done in a way that can be transferred to and used by others.

The Declaration is a joint statement of intent. Co-signed by 40 other organisations at its launch, it envisions a world where systems across all local authorities are built out of interchangeable components and are able to respond quickly, at little cost, to changing demands. These agile services will be driven by digital leaders who understand the power of technology to transform lives.

More than 50 organisations have now signed up, committing to help local authorities break their dependence on inflexible technology that can't be shared, adopt the best digital ways of working and – most importantly – offer excellent local services for less.

This is a priority for me; I am a great believer in local government and want to see a strong, confident and thriving sector. My determination to embrace technology to support local authorities stems from the life experiences that shaped who I am today. Before I became an MP, I lived in California for several years and ran a company that invested in businesses – spotting potential and making it happen. Of course, returns did matter, but these came from investments that were a success. It was a privilege to be close to, and an enabler of, the new products that were being developed and used.

Living in California, I wasn't far from the tech hub that is Silicon Valley, and I absorbed news of the ideas and projects that emerged there. Like London's Silicon Roundabout and tech hubs in other cities across the UK, it was an exciting place to be.

Tomorrow's tech

Of course, the challenges around funding in local government remain, and I am going to do all that I can to make the case for the sector across government and in next year's Spending Review. Those conversations will take time, though, and I want to see progress now. The sooner we can deliver changes to the way we work by embracing new ideas and acting in a coordinated manner, the sooner we can start to bring down costs and deliver better services.

I am very keen to work with CIPFA and its members on this agenda. Everyone needs to understand the role that digital can play, and must know when it is the right solution and when it's not. And it is the finance professionals within councils who are leading the efforts to improve value for money across organisations. They are in the engine room, balancing budgets and setting affordable financial strategies. They also know where ▶

'Councils are using data analytics to understand complex social issues and develop predictive models that help them intervene earlier'

the costs are, have a good sense of where there may be savings to make and can support services to deliver them. Crucially, finance professionals in local authorities also have an overview across the entire organisation – so they can look at the underlying systems and operating models.

Of course, greater use of digital won't solve all the problems the sector currently faces. We should not be using technology for the sake of it, but rather because it has an essential role to play in meeting today's challenges, modernising and building services for residents that are fit for the future.

The Local Digital team has created a prospectus for the fund. It has blogged about its initial user research to identify the digital training needs of leaders in local government, and will keep updates coming on its plans as they develop during the next period.

Technology is bringing exciting new possibilities for local government. A collective approach, focused relentlessly on the needs of the public, is set to revolutionise public services. You can find out more about the Declaration and the fund at: www.localdigital.gov.uk ●

'Today, digital transformation is as much an issue for the boardroom as it is for the basement'

The bigger tech picture

ESSAY

BY MATTHEW TAYLOR

Finance professionals need to be part of a wider transformation that is shaking up the role and purpose of government

Matthew Taylor is chief executive of the RSA

TECHNOLOGICAL INNOVATION is already significantly changing public services and wider society, but the most profound change is yet to come. The issue for finance professionals is not just how their core functions adapt, but also their ambition to be part of this much wider transformation.

We can think of the challenges and opportunities connecting public sector finance and technology as a series of concentric circles, starting with core functions and moving out to wider questions about the role and purpose of the government.

First, there are changes in the finance function itself. Reflecting a broader trend in the labour market, there is likely to be a hollowing out of finance directorates. Senior staff will play an important role in corporate management and there may still be a need for some oversight of routine processing tasks, but the combination of more sophisticated finance systems and continuing budget pressures will hasten the demise of middle-tier finance officer-level jobs.

A corollary will be the growing scope to devolve financial oversight and decision-making within organisations as more intuitive, real-time, self-service systems enable staff with little or no financial experience or training to take control of budgets.

These shifts are already happening, but the opportunities are more likely to be grasped, and resistance reduced, by adopting a whole-organisation, values-based approach with the explicit aim of making finance less about specialism and control and more about empowering decision makers at every level – from the executive to the front line to community groups. Successful organisations that are able to recruit and retain talented people need to have systems, including finance systems, that enable these people to take responsibility and show initiative.

Empowering citizens

A second set of issues relates to individual transactional services to the public. We have already seen payment systems move online, but a great deal more can be done to enable citizens to access and pay for services without having to go through cumbersome and frustrating processes. In the face of the ever-present and continuously changing risk of fraud, the big challenge is to make identity systems work more effectively.

Better data sharing, system interoperability and, longer term, the use of distributed ledger systems should help public agencies move to fully online systems for services in many areas that still rely on paper documents and in-person verification.

Here, again, change should be driven by principles rather than mere organisational efficiency. Making access to services as easy as possible is a public duty – especially given that disadvantaged groups such as frail older people, migrants or those working unsociable hours tend to find complexity particularly troublesome. There is also an opportunity here for public agencies, genuinely committed to helping people, to distinguish themselves from the commercial sector. The latter too often designs processes to deter customers from finding the most economical options or exercising their rights (as anyone trying to complain to their broadband provider will have found). Using intelligent customer

'Reflecting a broader trend in the labour market, there is likely to be a hollowing out of finance directorates'

relationship management systems, we can reverse the lazy assumption that private sector customer service is better.

Using public money as effectively as possible is, of course, an important principle in itself. However, across public services, poor and siloed data systems are still wasting huge amounts of time and money – not to mention demoralising staff and disappointing citizens. There are currently wide differences between local practices, with managers in some places using data collaboratively while others remain siloed and risk averse. As key voices in discussions about how to save money, finance professionals understand how much is still being wasted by old technology and poor data. They should be the champions of the investment case for a step-change in data management.

Standing further back, if they want to be at the centre of driving change and improvement, financial professionals need to understand and exploit the full potential of digital. The impressive London Sexual Health Transformation programme demonstrates some of the possibilities. The combination of user awareness and engagement, inter-agency collaboration (across 27 London boroughs) and effective use of digital tools enabled a much better service to be provided while significantly reducing core costs.

The lesson is clear: the full potential of digital – including the potential to cut costs – is only realised when managers are willing to reimagine the service as a whole. While finance professionals help set and monitor service budgets, how fully do they understand the way these services operate?

Intelligent procurement
The pace of technological change demands a more agile and experimental approach to service improvement. Intelligent procurement is an important element. Instead of inflexible long-term service contracts tied to existing models of delivery, public agencies need to follow the example of local authorities such as Hackney, sharing problems and, (as far as possible) data with tech entrepreneurs and service designers. The RSA's work on public entrepreneurship has suggested moving from an 'invest to save' focus on marginal improvements to an 'invest to solve' approach, so that genuinely new ideas can be tested and developed. Of course, there are risks to be managed and legitimate public concerns to be addressed – regarding data security, for example – but the speed of change made possible by digital means finance professionals need to make themselves the allies and enablers of innovation.

Recent years have seen local government financial expertise used to develop commercial asset-based strategies, helping alleviate revenue resource constraints. While some accounts of the value of public sector data – particularly health data – are probably exaggerated (much of it is not of a high quality), new technological possibilities mean that public agencies need to make use of those commercial instincts.

On the one hand, this is about being able to reach ambitious deals where there is genuine scope for technologies such as machine learning or robotics to achieve a step-change in service cost and quality. We are already seeing how AI could slash the cost and improve the reliability of almost all health screening and scanning, for example. On the other hand, it is about ensuring that, when public sector data or expertise is involved

in developing marketable technological innovation, the taxpayer too reaps some of the commercial benefit.

Local economies

Thinking more broadly still, public agencies – particularly local authorities – can play an important role in resetting the way local economies work. Still struggling to emerge from the shadow of the global financial crisis, a growing number of regions and cities around the world are committing to the idea of inclusive growth. A key part of this is ensuring that local assets benefit local people. Data is now arguably the fastest growing asset class, while digital networks are the new utilities.

The commoditisation of technology will lead to public bodies buying more services from global vendors, but there will also be opportunities to build local tech – whether by providing application programme interfaces (APIs) to stimulate local innovation or by building internal capacity through apprenticeships and partnerships. The technocratic model of smart cities has been discredited by the failure of reality to match the hype and by people's legitimate suspicion of corporate motives. However, from the platform economy to the internet of things to distributed energy systems, more people could be enabled in the future to create and build their own assets, whether in data, space, time or energy.

A new model should be based on the combination of technological innovation and a new, more localised political economy that is inclusive and sustainable but also empowers many more citizens as active economic agents. These are exciting opportunities, but they need to be underpinned by robust and transparent financial systems.

As the lens widens from existing financial systems to service improvements, service transformation, commercial exploitation and even new local economic models, it may feel as though we are moving a long way from the day-to-day concerns of hard-pressed public sector managers. This, too, is a characteristic of a world accelerated by technological innovation. Financial professionals can either accept a diminished role as machines get better and better at human tasks, or they can start to explore how their developing skills and public service ethos can be best placed in the service of a tech-enabled future that works for everyone. ●

'There is also an opportunity here for public agencies, genuinely committed to helping people, to distinguish themselves from the commercial sector'

Visions in the cloud

ESSAY

BY CHRISTINA THOMPSON

Lambeth Council is using cloud technology to transform the way it delivers services

Christina Thompson is director of finance and property at Lambeth Council

IN 2016, the London Borough of Lambeth launched its Future Lambeth programme with the aim of working more simply and smartly, and creating a stronger organisation. This is a major organisation redesign programme affecting all levels and activities within the council, including employee roles and responsibilities, business processes and how we engage with customers.

The programme recognises the need to invest in staff skills, the workplace and technology – and in our customers. Whether they are residents, businesses, public sector partners, contractors or developers, the council's customers expect high quality services.

Technology has changed the way we consume services and, as a result, expectations are higher. These days we all demand a fast response to our queries and requests. Just think how you feel when you ping off that text or email and fail to get an immediate reply!

Lambeth is one of the most densely populated inner London boroughs, with 320,000 residents; its population is relatively young and lives in mostly rented accommodation. While we have migrated some services to online, self-service and anytime access, a lot of the responses still rely heavily on individuals at the other end translating them into another form of data entry.

Consequently, we have had to go further, focusing on convenience and speed for the customer and better use of human resources. We're always hearing about how 'sweating our assets' is important when it comes to bricks and mortar, but we also need to use staff time more effectively and efficiently. The workforce is our most important asset and if the organisation is to change, we need to prepare staff for the challenges ahead. This means recognising the need to invest in employees, so that people have the right skills and knowledge to make the best use of both existing systems and the systems we are introducing across the council.

Early adoption

We know that we need to adopt new technologies and deliver more of our services using digital means, while also reducing costs and improving efficiency. In the first instance, this means investing in technology. This is something Lambeth has been doing; recent examples include Microsoft Office 365 and SharePoint; Skype for Business; digital documentation management and digital mail services; and Oracle Fusion (Cloud).

The council decided early on in its ICT strategy to ensure that consideration of cloud-based solutions took precedence over traditional options; the cloud frees up space and has the capacity to manage traditional systems while offering secure mobile working. It follows that all new technology and application options proposed for the cloud within the council have been reviewed for compatibility. The cloud is opening up new opportunities for staff, allowing them to work flexibly and differently. This helps to address their work-life balance, offering them the freedom to work from home and out of the office.

This is proving particularly important as we reduce the number of our core offices from 14 to two. The most visible symbol of Future Lambeth is the completion of the award-winning refurbished town hall and the new civic centre in Brixton, providing staff and

customers with modern accommodation and technologies that offer a better working experience and improved customer engagement. It has meant embracing a new working culture and practices – something that takes time to embed.

Lambeth's latest move to the cloud has seen the implementation of the full offer from Oracle within 12 months – the first council in the country to achieve this. We have had some strong drivers of change. An important one has been the office accommodation rationalisation and relocation, requiring our teams to work in a more flexible way. In addition, our existing One Oracle contract arrangement was coming to an end. As this had been a partnership arrangement with six other councils, it involved joint negotiations to agree an archiving solution and data transfer agreement.

Clearly, it was important to have the right governance arrangements around the implementation project, together with support from the senior management team. I set up the Oracle project board that brought together the technology provider, implementation partner and change management partners, as well as the corporate resources leads that managed the teams involved in delivering the project. What proved really important was partnership, collaboration and teamwork.

We were looking for smooth implementation of a platform that: aligned with Lambeth's organisational redesign; could enable and support a reduced workforce to deliver services to customers and residents, with improved processes and technology; and supported the new ways of working, driven by our reduction in office accommodation. It was important to achieve a successful transition to the future operating model, and we wanted a smooth exit from our existing contract, which expired in July 2018. There was also the financial imperative to move to a solution that offered savings on future costs.

The cloud version of Oracle also allowed us to use its modules to decommission some of our standalone applications for recruitment and performance management, and could also be integrated with other core applications, such as in housing and social care. We were also seeking an improvement in future system performance and service standards compared to our experience with the system we were using. It was quite a lot to get right.

Listening to users

We are fortunate in that we have been an Oracle House since 2000, which means we understand its capabilities and limitations. Generally, we are satisfied with how it has worked for us. We saw the move to the cloud as an opportunity to standardise and simplify system and business processes, and promote increased collaboration across the finance, procurement and human resources teams.

From the point of view of most users in the organisation, the move to Oracle Cloud is just an upgrade, albeit with a few differences in look and feel. The system supports mobile and agile working and is putting the focus on service delivery and community support. One of the major changes we have seen since moving to the cloud is a reduction in system maintenance, support and upgrade requirements. Updates to the system are planned and delivered by Oracle on a quarterly basis, with a reduced requirement for testing at our end.

We have had some very positive user feedback. Users like the single sign-on as they have one less password to remember; many have commented that it is easy to use and that the dashboards make it look smart and simple. It is accessible from any device, including mobile phones, which supports our mobile working policy. There have been the usual teething issues associated with any new system, but we are getting over these with help from our implementation partner and our dedicated in-house team.

Now we are planning for updates to the Oracle Fusion system, and integrating advances and new functionality within the cloud solution planning and budgeting tool. With support from our partners, we have developed a number of reports as part of the implementation exercise. We are looking to implement the report-writing tool for users in full, including options around developing the dashboards. We have had to adapt our model to take account of the difference in support required in the cloud system compared to the on-site platform model.

We are continuing to listen to users and to run the drop-in sessions that we offered during the launch. These are picking up on common issues experienced by users, particularly around paying suppliers. They are able to bring up particular issues they need help with and get practical aid in resolving them.

We know we can get more effective use from the system. For example, we introduced project accounting as part of the implementation process and recognise that, while it has been well received, it does require further work. This will help the user community make full use of its capabilities and get the best results for their services. ▶

'Technology has changed the way everyone consumes services and, as a result, expectations are higher'

Spread the word

As the first London council to implement Oracle Fusion in full, we have been contacted by a number of authorities and other public sector organisations asking us to share our experience and offer tips on how to make their own implementation successful. The most useful piece of advice I can pass on is one that I am sure anyone who has experienced systems implementation is aware of: make sure your data is clean before it is loaded into the new system. It sounds simple and obvious, but get this wrong and you can be left trying to tidy up for months after going live.

My second tip is to make sure your internal business processes actually fit the new system: don't assume that you will change the system to fit your process. This is part of an essential culture change. So many of us are used to legacy systems that have been tweaked and re-tweaked to fit our needs.

Last but not least, make sure you have the full support of your senior management team. It really helps when there are competing priorities for the teams at the sharp end of implementation.

Most of the development that we have carried out so far has involved laying the foundation for efficient internal working. Now we need to ensure this can be integrated with systems that provide our customers and residents with efficient and effective access to services. ●

'We saw the move to the cloud as an opportunity to standardise and simplify system and business processes, and promote increased collaboration'

DIGITAL
BY DESIGN

AI: Audit Intelligence?

ESSAY

BY MAX TSE

As new technologies develop, the role of the public finance professional is more important than ever

+

Max Tse is an executive leader at the National Audit Office, with oversight of digital transformation

HAVE WE REACHED 'peak audit'? Carl Benedikt Frey and Michael A Osborne's famous 2013 study, *The future of employment*, looked at 700 jobs and estimated their susceptibility to computerisation; according to the study, there is a 94% probability that accounting and auditing jobs will be computerised at some point. While the government's digital strategy sets out how it aims to maintain world-leading online services and adopt new technologies such as cloud-based software, the audit profession faces significant questions about the quality and relevance of the traditional audit model.

At the National Audit Office, we've been thinking hard about the implications that new technologies have for the way we carry out our financial and value for money audits. New technologies are already having an impact on the way we do our audits and the way we operate our business. We are embracing the opportunities they create, but are still a long way from the end of this journey. In the meantime, we see a greater role than ever for public sector auditors and finance professionals in understanding public spending and performance.

The opportunity

To understand why we think public finance professionals continue to play such an important role, it is worth considering how new technologies and techniques affect our ability to develop and apply knowledge effectively, increase the impact and relevance of our audit work and deliver high performance in the way we do our work.

● **Applying knowledge effectively**

A valuable function for auditors – and finance teams more widely – is to develop a holistic understanding of the organisations they work with and draw on wider experience to identify and share good practice.

New tools and techniques allow us to pull together a clear overview of audit tests, presenting a financial picture of an organisation. We are increasingly using new techniques and visualisation tools to develop dashboards of journal analytics, drawing together a range of tests for unusual transactions and statistical outliers. Presenting this information together in a standard way allows us to see quickly where there are issues, and we can use this dashboard to drill down into individual transactions.

Analytics has proven valuable in gathering and standardising our knowledge on value for money. Whereas in the past we used to undertake costly reviews of documentation, we now have tools that can search and extract all mentions of search terms, along with the surrounding text. We can perform basic analysis of reports to see how often a topic is covered, and which words and phrases are typically used in the same sentences, where they occur. We've also developed ways to extract and standardise key government data sets, allowing teams to quickly review public data on a topic and accelerate the early stages of reviews.

● **Increasing impact and relevance**

The second significant development is in the ability we now have to communicate and explain public finances. It is now relatively simple to create interactive visualisations that improve the accessibility of information about both spending and performance. For example, we've found that our visualisations of the Whole of Government Accounts were viewed 25,000 times over two years. Even internally within organisations, visualisation techniques such as Sankey diagrams can help track different sources of information for complex financial statements.

Mapping is a key way in which visualisation of data has helped us to broaden the impact of our work. An online visualisation we created to support our review of the housing market was viewed 2,500 times in the three months following the publication of our report, helping parliament and members of the public to understand the links between spending and performance and the personal relevance of our findings.

In our financial audit work, where our role is to assess the truth and fairness of accounts, we are using data analytics and data visualisation tools to identify unusual transactions in financial records. These analytics are used across a range of business processes, including revenue processes, purchasing processes and payroll, as well as allowing us to reproduce and test models of critical accounting estimates.

We apply some level of data analytics across a growing share of our 370 financial audits each year. These tools are not only helping us make our audits more effective and efficient, they are able to provide the senior management of our audit clients with greater insight into, and awareness of, their business operations. For example, data analytics undertaken on an organisation's purchase-to-pay system allowed us to show a number of control issues that led to the chief executive of this organisation publicly acknowledging the 'NAO's very clever diagnostic tool that helped us to understand what was happening'.

● **Improving performance**

The long-term promise of new technologies is in their ability to transform the way we work and – as Frey and Osborne's 2013 study suggests – reduce the need for people to undertake routine tasks.

New analytic techniques can be both more accurate and more efficient. Eliminations errors in the Whole of Government Accounts amounted to £12.8bn in 2012-13. Calculating this error is fiddly and there can be many line entries for a single error. In the past, this process involved auditors spending weeks working their way through spreadsheets, with all the cost and quality risks this entails. Using a few lines of audit code, in contrast, allows us to do the same exercise in less than an hour.

Analytic techniques can also help assess the impact of changes to government services. Our website has a mapping tool that shows the locations of jobcentres and the average travel times for people living in different areas – our Jobcentre journey time model. This tool allows people to calculate how travel times are affected by Jobcentre closures under different scenarios, giving a richer view of the 'value' side of the value for money equation when considering estates closures.

Artificial intelligence and machine learning present opportunities to review patterns in behaviour, whether to improve government services or prevent fraudulent transactions. We have been experimenting with data tools that have AI capabilities, specifically to help us identify unusual patterns in financial data. The challenge we face with these tools is that because they 'learn', the tools do not lend themselves to replicability of results – a key requirement for a financial auditor. As such, we still need to develop our skills and knowledge of these tools before they will be used widely on our audits. In the meantime, an ecosystem of new tools is developing to improve audit documentation, bank confirmations, process automation, secure data exchange and spreadsheet review, all combined with cloud-based technologies. These are providing more flexible and scalable opportunities to apply new techniques to large data sets.

The challenge

Despite the promise of new technologies, we're still in the foothills of what can be achieved, and gains in efficiency are often offset by the increasing demands on auditors to understand new and evolving systems. In our financial and value for money audits, the most tangible gains are still due to the application of the simplest techniques, such as web-scraping and visualisation. There is also constant pressure on our capacity and capability to develop and apply new approaches. ▶

'Analytics has proven valuable in gathering and standardising our knowledge on value for money'

Our own experience, and what we've seen when reviewing the transformation of government services, suggests that the audit and wider public finance profession will still play a crucial role for some time – for several reasons.

First, challenges around the management of personal and administrative data, and natural trade-offs between data requirements and user experience in services, mean that judgments about the reliability and completeness of data will remain a crucial audit function. In the short term, to even perform some of the new analytical techniques, we will need to deal with data quality and manipulation, and this 'data wrangling' is one of the most important capabilities we've had to develop. New regulations designed to safeguard personal data mean we have to ensure our handling and securing of data is robust.

Second, the finance function will play a crucial role in shaping the transition path for new technologies, both in finance and in wider government services. Innovation is important but expensive, and the decision about the optimal rate of investment and adoption of new technologies is a difficult judgment that must consider organisational capability, spending and performance. Moreover, we have to balance innovation with the technical debt it creates. Building new systems with new techniques creates a future legacy to maintain.

Finally, new technologies will create their own challenges for organisations and their auditors. The modernisation of systems across government should allow us to move away from a heavy reliance on developing analytics ourselves, and instead to a position where we can rely on automated controls. However, we are still in the early stages of understanding how oversight and controls should work in new environments such as cloud providers and constantly evolving systems.

The role of auditors and public finance teams will need to adapt to these challenges, and we expect to see an increasing role as opportunities arise to draw better links between spending and outcomes. We believe that, as government's business systems mature, with all aspects of the business becoming digitised (for example, digital invoices fully replacing paper), the opportunities to apply technological solutions to better understand public spending and services will grow.

In such a scenario, we envisage ever further opportunities for public auditors to draw links between spending and performance and provide an integrated public audit perspective. ●

This article is co-authored with Peter Smithson, director of information assurance at the National Audit Office. The National Audit Office scrutinises public spending for parliament and helps government improve public services. It is independent of government. The NAO is led by the comptroller and auditor general, Sir Amyas Morse, who certifies the accounts of all government departments and many other public sector bodies. To find out more, visit www.nao.org.uk

'Artificial intelligence and machine learning present opportunities to review patterns in behaviour, whether to improve government services or prevent fraudulent transactions'

Links in the chain

ESSAY

BY GRACE MA

Blockchain technology has great potential for public services – but it is not a silver bullet

Grace Ma *is programme manager at the fintech company AID:Tech*

DURING THE PAST two years, blockchain has become a buzzword throughout the public sector and beyond. Governments across the world are enthusiastically experimenting with the new technology and conducting research and analysis into its potential. According to a recent OECD report, by March 2018, more than 46 countries had launched or were planning over 200 blockchain-related initiatives.

The Dubai government plans to provide all public services via the blockchain by 2020. Estonia has already integrated its healthcare delivery services with blockchain and aims to extend the approach to other public services. The Swedish and Georgian governments both plan to implement blockchain-based solutions for the management of land and property registries and to enhance real-estate transactions. In the US, Delaware's blockchain initiative is designed to add value by making the state home to nearly 1 million incorporated entities.

Even so, blockchain's growing status as a conversation starter has not been without pushback. Deloitte's latest global blockchain survey found only 46% of public sector workers believe the new technology will lead to productive digital disruption in their sectors; 39% of those surveyed think the technology is being overhyped, while its real-world benefits remain elusive. A certain 'blockchain fatigue' has already set in, according to the report's authors.

Which is it, then? Is blockchain a potentially radical solution to many of the financial stresses and pinch points faced by public services, or an over-promoted technical offer that does little to address the public sector's real concerns? Before exploring these issues, however, let's discuss what blockchain technology is, and what it isn't.

Demystifying blockchain

A useful way to visualise blockchain is as a spreadsheet that is replicated across multiple computers (potentially hundreds or thousands) on a network. Each time a record is entered or altered, the computers on the network need to arrive at a 'consensus' that validates the entry. Once this happens, the information is cryptographically secured before being added to the spreadsheet, which automatically updates all the computers holding a copy.

However widely they are distributed, the computers always hold the same, most up-to-date version of the spreadsheet. Each computer also plays an equal role in validating records for the spreadsheet, which means they cannot be tampered with and they maintain immutability.

By using blockchain, ownership of information is decentralised while being kept secure and accessible. Secured by network consensus, the single point of failure that is common in centralised databases is removed. Data on the blockchain cannot be illegitimately altered, because it is underpinned by permanent records. The data is also accessible and available to every computer on the network.

In short, blockchain offers security, transparency and efficiency when it comes to data capture, management and dissemination. What, though, does it have to offer that could specifically address the challenges faced by the public sector? ▶

'39% of public sector
workers surveyed think
blockchain technology is
being overhyped, while its
real-world benefits
remain elusive'

There are several change drivers surrounding the supply and demand of public services: a growing, ageing population and wider social changes; disparate geographical economic performance and a transformed employment landscape; environmental challenges and central government funding and policy shakeups, to name a few. These changes – alongside growing costs and investment requirements, and greater citizen expectations – have major implications for the delivery of public services. There is a demand, whatever the cause, for improved service delivery and an improved user experience that also maintains reasonable costs and security.

Identity matters
Since its introduction in 2009, we have seen a proliferation of blockchain-as-a-service solutions that are applicable to the public sector. Generally speaking, these focus on one of three functionalities.

The first of these functionalities is identity management, one of the new technology's key offerings for the public sector. When unique digital identity is issued on the blockchain, a set of public and private keys is also issued, creating the unique 'wallet' of addresses that many associate with blockchain technology. Issuing this identity enables transaction records or asset documentation to be maintained digitally. This is particularly important in a world where 2.4 billion people are without a legal identity: only 19 out of 198 economies provide a unique ID at birth and use it consistently for civic identification and the delivery of public services.

In economies and territories where unique IDs are available, blockchain's great potential lies in its role as an impactful enabler. For example, it can facilitate better day-to-day management of assets and transactions between states and citizens on a multilateral basis. The provision of a verified digital identity means that individuals can utilise this state-approved tool to access a multitude of services, from healthcare to social and welfare support.

Service providers with integrated identification solutions can streamline the process of managing new and prospective users. Blockchain helps them address issues around different attestation processes, which are often time consuming and administratively intensive. When someone wants to open a new bank account, for instance, they have to provide a variety of required documents, either in person or digitally. If verified and shared records of unique IDs are available, processes like this could be made redundant.

A second area where blockchain could make a huge impact on the public sector is in relation to enhancing management processes. Managing and using data in the sector is a complex affair, especially given the rigorous requirements around security and privacy. Many governments use ineffective measures, with some processes existing only in paper form. This is an issue for developed and developing economies alike: for governments in developed economies, legacy processes and systems that have been in place for decades are often still the norm. Digital transformation, whether based on blockchain or not, still faces consistent barriers, such as supplier lock-in.

According to a House of Lords report, traditional information systems are often centrally located, yet data is duplicated over and over and involves many redundant reconciliation

processes. Many governments in developing economies work with absent or immature digital infrastructures. This lack of effective information communications massively affects operational performance and adds to costs and margin of error. The need for structural disruption is greater now than ever before.

With blockchain, every transaction and asset documentation associated with a digital ID is automatically documented cryptographically. Examples ranging from documenting land or property ownership to receiving and spending welfare payments demonstrate the potential. Once on the blockchain, these records are transparent to the network, enabling traceability without imposing excessive administrative costs. In fact, blockchain could substantially reduce the burden many of us associate with public sector work: pen and paper-based administrative processes.

Shared services
A third class of blockchain-based solutions offers an environment where information can be trusted and easily shared between governmental agencies, and between governments and their citizens. Challenging the often siloed and fragmented status of information systems, blockchain offers the opportunity for policy makers and civil servants to consider systems that are shareable between departments and agencies on a practical level. Many public sector interactions involve cross-departmental communications where privacy and certain segregations are necessary. Blockchain takes this into account, offering the ability to provide different agencies with specific pieces of information without divulging bulk data indiscriminately.

It also secures 'data by design', providing scope for additional features. Underpinned by digital identity, solutions are possible that not only offer efficiency improvements but also enable citizens to regain control over personal data. Those who hold a unique ID – and subsequent transactional and ownership data – can leverage, or even monetise, how it can be used by other parties, including the government.

Beyond improving efficiency, blockchain-based solutions offer ways to improve the delivery of public services and help re-engage trust between governments and their citizens and constituents. Its potential for creating truly interconnected, networked public services across developed economies hinges on the technology's strength at addressing the key challenges facing existing processes and legacy systems.

For developing economies, the technology's strength lies in its ability to deliver standalone solutions. For example, blockchain digital identity can play a key role in establishing standards around legal identity. From the perspective of public service delivery, a willingness to experiment with innovative technology offers the opportunity to leapfrog conventional solutions that have previously been seen as simply 'good enough'.

No silver bullet
Blockchain is not a silver bullet, and it has its own obstacles to overcome. The main challenge involves the building of an adequate operational foundation. Blockchain is only nearing the end of its first decade, and still requires demystification. For example, it is ▶

'By using blockchain, ownership of information is decentralised while being kept secure and accessible'

still often thought of as synonymous with Bitcoin, an application of the technology that only showcases certain aspects of its strengths.

The lack of standards and regulatory approaches around blockchain leaves many hesitant to experiment with taxpayers' money. Additionally, the current skills shortage in the UK reflects how the public sector has to compete with other sectors for experts who can act as facilitators to bridge the gap between social and technological development.

The challenge is not just to be able to communicate the technology's potential, but also for it to continue to grow alongside other changes. As with any other technology, blockchain has to be designed, developed and implemented alongside social, financial and legal variables. The introduction of GDPR led many to question the applicability of blockchain, for instance, but many solution providers have introduced methodology that complies with the new legislation – and thrives.

The novelty of the technology could also be a deterrent, but the proliferation of public-private partnerships shows encouraging signs of public sector willingness to work with the private sector, including with SMEs. This suggests that the adoption of innovative technologies is being seriously considered.

The development of collaborative, open-source computer communities is another cause for optimism. Digital identity is on its way to achieving a status whereby data will eventually be truly owned and controlled by users, not by institutions or intermediaries.

Meanwhile, discussions continue around whether the hype overstates the practical applications of the technology. While this is important to consider, blockchain is gaining traction, and positive results put it on track for wider adoption. These developments will hopefully serve as evidence to help policymakers and civil servants assess whether the technology is suitable for them.

As the OECD has argued, the impact of blockchain on the public sector is, at best, misunderstood – and most often ignored. The key to successful disruption in the public sector is therefore not to expect overnight transformation, but to encourage cautious learning and gradual experimentation. ●

'As the OECD has argued, the impact of blockchain on the public sector is, at best, misunderstood – and most often ignored'

Keeping it safe

ESSAY

BY CLARE GARDINER

Public sector leaders need to open up the discussion about how to make the sector's cyber defences stronger

+

⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯⋯

Clare Gardiner *is*
director of
engagement at the
National Cyber
Security Centre

THE NATIONAL CYBER SECURITY Centre has brought together a number of existing teams from government departments and agencies to achieve the UK's ambition, outlined in the National Cyber Security Strategy, of making the UK the safest place to live and do business online.

This means that we don't just look after the government's cyber security. We are committed to supporting organisations across the public, private, voluntary and not-for-profit sectors as they improve their cyber resilience and their understanding of it. We also provide advice to the general public on our website and want to make sure that everyone understands why cyber security matters.

In 2017 we responded to 603 significant cyber incidents, ranging from attacks on key national institutions such as the NHS and the UK parliament to attacks on large and small businesses. We have all seen the news reports about household names falling victim to cybercrime. These incidents are costly for organisations to remedy and damaging to their reputations.

Many other incidents are not so widely publicised, including denial of service attacks against banks and other institutions. These low-level attacks can still be extremely disruptive to organisations. Cybercriminals may want to encrypt your files and blackmail you into paying a ransom, or they may wish to steal the financial or personal details of your staff, customers or users. They don't need to use advanced techniques, or even have much training or technical skill, in order to carry out such attacks. This is why it is so important that all organisations take these threats seriously.

Resilient services
The UK's prosperity is intrinsically linked to its cyber resilience. With the number of public services available online growing, there is a risk that these services could be disrupted by a cyberattack – and sensitive data stolen.

Cyber security is an important business risk that needs to be managed. We believe it is of board-level importance for all organisations, and that clear, informed leadership is needed to drive the right thinking, behaviour and culture. That's why, in September, we published five questions that boards should ask in order to start the cyber security conversation in their organisation.

The questions form part of the wider development of a board 'toolkit', which draws key advice and guidance together with questions that we believe every board should be asking. We've been working with boards to determine what support is needed to ensure leaders, and staff who report to them, can recognise threats, enable discussions and implement appropriate measures.

● **The five questions to get your discussion started are:**
1. How do we defend our organisation against phishing attacks?
2. What do we do to control the use of our privileged IT accounts?
3. How do we ensure that our software and devices are up to date?

▶

'With the number of public services available online growing, there is a risk that these services could be disrupted by a cyberattack and sensitive data stolen'

4. How do we ensure our partners and suppliers protect the information we share with them?
5. What authentication methods are used to control access to systems and data?

We aim to make our advice as accessible as possible and, in addition to more general guidance, we have worked with some sectors to produce bespoke guides. One example is our small business guide, which provides basic steps that we think small and medium-sized enterprises can implement easily and cheaply to increase their cyber security.

Prevention
We are creating solutions to prevent as many attacks as possible from reaching users. Our active cyber defence programme consists of a series of services that we have rolled out across government with the aim of: preventing spoofed government emails being received by members of the public; preventing government employees from accidentally visiting malicious websites; detecting vulnerabilities in government websites before they are exploited; and removing malicious websites hosted in the UK as quickly as possible, limiting the harm they can cause. We've had great success with this programme, and our aim is to encourage others to adopt solutions like these for their own sectors.

To aid collaboration, we host a dedicated forum for industry professionals, where they can share knowledge of cyber security best practice. The Cyber Information Sharing Platform (CiSP) is a joint government and industry initiative that aims to build a cyber-aware culture and improve organisational resilience. Earlier this year we created a private group, specific to the accountancy sector, where members can exchange cyberthreat information in a secure, confidential and dynamic environment. CiSP increases situational awareness and reduces the threat impact on UK organisations.

If I could offer one piece of advice, I would encourage you to engage with your technical teams and open up the cyber security discussion. You don't need to know everything, just enough to help make your own defences stronger. We know that the subject of cyber security can be daunting, but these conversations, we hope, will encourage the right changes. We all have a part to play in making the UK the safest place to live and do business online. ●

PUBLIC
DOMAIN

The real finance revolution

BY BRUCE DAVIS

Alternative financial models, driven by fintech, are creating new opportunities for public sector investment

Bruce Davis is joint managing director of Abundance Investment

THE FINTECH REVOLUTION is coming to public finance. The past decade has seen financial innovations change the way individuals and companies raise finance, get credit and invest money. When it comes to public finance, this revolution couldn't be timelier.

Local authorities and other public bodies face many challenges that will require increased investment in infrastructure. This has been highlighted by the government's national infrastructure commission, as well as by the green finance and social investment taskforces.

Conventional ways of financing public service delivery and infrastructure – such as private finance initiative structures and the Public Works Loan Board (PWLB) – have been centrally controlled and sanctioned. The PWLB currently has more than £60bn of loans outstanding with public sector bodies on a range of maturities that have been taking advantage of the UK's current low cost of borrowing. This borrowing has grown steadily during the past 10 years and has been used to fund a wide range of projects.

However, the benefits of monetary interventions such as quantitative easing, which are driving down gilt and government bond prices, won't last forever. At some point the Bank of England will start to unwind its asset purchases, with all the risks that carries for future interest rates. Public finance professionals need to keep their options open.

Social licence
Private finance initiatives have undergone a number of transformations and policy relaunches as issues arise. They carry a negative perception with the majority of the population and media commentators due to the relative opacity of these deals – and the suspicion that the private sector is profiting from risks that have the backing of the taxpayer.

The recent collapse of construction company Carillion has shown that private sector companies do carry the can when a project fails or overruns its budget. Nevertheless, negativity around the funding of public infrastructure by private finance has prompted the likes of Aviva Investors to claim that the PFI investment community risks losing its social licence to profit from public investments in the future.

During the same period, the structure and composition of the UK's financial system has been transformed. The rise of peer-to-peer (P2P) lending and crowdfunding resulted in more than £6bn being raised and invested in the UK in 2017, and hundreds of billions globally. This has created new ways for public sector bodies to finance their responsibilities.

The success of P2P and crowdfunding is exemplified by the imminent billion-pound initial public offering from one of the largest players, Funding Circle. The sector has earned recognition from the Treasury for its significant role in diversifying and de-risking the UK financial system, which, prior to 2008, had become too dependent on increasingly similar banks and banking models.

Almost a million individuals in the UK have made an investment with either P2P lenders (which allow you to lend money direct to individuals and small businesses)

or investment crowdfunders (which raise bonds and equity for businesses and infrastructure projects). People are increasingly using the new Innovative Finance ISA to carry out such investments, with more than £300m having been invested in this way by 31,000 investors. These investments generate returns of anything between 3% and 15% per annum, depending on the lending or investment risk.

Democratising finance

Financial technology – fintech – underpins this revolution. Fintech is about much more than the introduction of new technology; finance itself is becoming more democratic, more transparent and more focused on the needs of smaller investors. For example, the concept of P2P loans required an entirely new set of rules from the Financial Conduct Authority when it became regulated in 2014. This took place 10 years after the launch of the first P2P lender, Zopa, and followed several years of lobbying by leading platforms to be included in the regulated financial system.

In contrast, investment crowdfunding models rely on existing legislation and rules governing bonds and shares more generally, with additional protections to ensure small investors understand the risks of their investment. Despite naysayers in the conventional finance industry, this has not led to a rise in complaints to the Financial Ombudsman. Alternative finance is actually demonstrating high levels of customer satisfaction and loyalty.

Prior to the development of these new forms of finance and investment, it was difficult for small investors to diversify their investments beyond increasingly passive funds and blue-chip shares – and almost impossible for them to put their money to work locally, except through one of the few remaining truly local building societies. Internet and software-based technological innovations have opened up these investments to a new breed of investor who prefers to trust in their own judgment and due diligence to fulfil their financial needs.

It was the banks that brought the 2008 crash upon us, and the taxpayer funded the bailout that saved them – with everyone picking up the tab in the form of austerity. One of the problems that exacerbated the 2008 crisis was the increasing centralisation and industrialisation of financial institutions. Since 2008, this process has been in reverse, with alternative finance creating more decentralised, democratic financial institutions that are embedded in the real economy.

Crowdfunding and P2P claim the moniker 'democratic finance' on the basis that they are built for the needs of small investors who want to take back control of their money. These investors were often ignored by conventional finance, which lacked the technological expertise to scale up the number of investors and instead chose to focus on those offering the greatest value for the least effort. Investing should not only be the preserve of the wealthy.

The democratic nature of alternative finance fits in well with the funding of local infrastructure, giving people control over their money and helping to build projects and fund businesses in the local economy. There are now more than 80 different P2P and crowdfunding businesses in the UK, funding a wide range of businesses and projects.

Platforms such as Abundance Investment – which I cofounded with my co-directors Karl Harder and Louise Wilson in 2011, to fund green and socially useful projects across the UK – have raised millions from small investors. Such initiatives give people the opportunity to invest in things they care about while generating good long-term returns to meet their financial needs.

Future facing

One example showing fintech's potential is Swindon Borough Council, which in 2015-16 worked with Public Power Solutions – a wholly-owned company of the council – to finance 10MW of solar park developments on council land via the UK's first 'green ISA' offer to its residents. The council lent around 50% of the money needed in the form of a shareholder loan, with local residents and others across the UK raising the balance through a regulated debenture offer issued via our investment platform. The investors ranged from those putting in £5 to those investing many thousands, at a competitive offer of a 6% rate of return over 19 years.

The project became a showcase for SBC's future-facing agenda to become energy sufficient during the next few years. Its 'clean growth' developments, from a projected 200MW of local energy generation to energy efficiency initiatives, achieved local and national media attention. ▶

'Fintech is about much more than the introduction of new technology'

The model employed was essentially a project finance structure, procured and managed by the experts at PPS, with equity plus a long-term loan from the council and a debenture raised from local investors. This established the principle of locally financed clean growth providing a return for local residents and the local authority, in pursuit of collective carbon reduction and energy self-sufficiency targets. As the FCA-authorised firm, we signed off the offer of debentures to the public and provided ongoing services, including a payments infrastructure and a secondary marketplace for investors.

Without the fintech revolution, this project would not have been possible. The cost of servicing thousands of small investors and making sure that all the rules and regulations of a public offer were carried out would have been uneconomic. By allowing investors to open an ISA in seconds without the need for paper forms or signatures – and providing all the necessary tax and HMRC reporting and communications – our platform facilitated the Swindon initiative.

Next generation
The next generation of projects, beyond the green sector, is now being considered – facilitated by an innovative funding initiative from the Inclusive Economy Unit, based in the Department of Culture Media and Sport, called Financing for Society.

Led by the Bauman Institute at the University of Leeds, it is funding six projects with public bodies that want to understand how fintech, specifically crowdfunding and P2P lending, can raise finance and increase citizens' engagement with local infrastructure needs and decisions. Local development has always struggled to get the attention of busy people. This means a narrow group of individuals, not necessarily representative of the wider population, can dominate feedback on project value.

Evidence from Swindon and elsewhere suggests that opening up local infrastructure projects to ordinary investors creates a more relevant platform for local engagement. It provides a greater incentive to look beyond the headlines at benefits to the local community, economy and environment. The choices we make about money are as political as they are financial. Giving citizens the power to use their money for local, social good helps make local politics relevant.

Public fintech innovation has the potential to transform not only public finance, but also public engagement and politics – turning it from a conversation between the few to a democratic choice of the many. ●

'One of the problems that exacerbated the 2008 crisis was the increasing centralisation and industrialisation of financial institutions'

A new digital landscape

ESSAY

BY MARC McAULEY

The public sector has come a long way on its digital transformation journey, but there are some tough challenges ahead

Marc McAuley is CIPFA's counter fraud manager

WHEN I STARTED working for the public sector in the mid 1990s, it felt as though councils spent more on paper, pens and paperclips than on computers. Digital transformation didn't just change the way we recorded and used information, it changed the landscape of the authority, enabling closer working and the sharing of information. It allowed the authority to streamline processes and reduce staff numbers and accommodation costs.

Innovators within the areas of audit and fraud were quick to realise the potential of technology and the value of data. In 1994, the Audit Commission began its National Fraud Initiative exercise, which matched electronic data within and between public and private sector bodies to prevent and detect fraud. This was pioneering, and made way for the use of data in identifying and managing risk in the public sector.

There were some quick wins when authorities first transferred the content of manual files into digital format. One council's pension section identified a number of pension records paid to the same bank account, leading to the arrest of a staff member who had chosen, upon notification of a pension recipient's death, to merely change their bank details – funding a property portfolio in Ireland. Another council created a digital register of their housing stock, which led to the discovery of a number of properties where no rent had been collected for many years.

The public sector has always been frugal and its priority is core service delivery. Government departments have never been awash with cash and have relied heavily on old IT infrastructure, while the private sector has had the opportunity to invest in innovation, creating new technologies and business opportunities. As senior staff became more digitally aware, more funds were made available, not merely for improving technology but also to improve customer experience. This led to a significant increase in investment for transforming the organisation, focusing on innovation and collaboration.

Barriers and risks

The public sector has come a long way since the introduction of technology, though there is a long way to go. In July 2018, CIPFA released a joint publication with Eduserve, a not-for-profit provider of technology advice, engineering and support. We looked at the role of finance in public sector transformation and set out how public bodies could achieve benefits and understand the risks. Through a series of roundtables involving 230 public sector finance professionals and examining the role of finance teams in digital transformation, CIPFA identified that only 58% of public service organisations had a digital strategy and less than a third (28%) of organisations operated a digital-first approach in all new initiatives, programmes and service plans. The biggest barriers identified were legacy IT systems and practices, the capacity and capability of IT services and financial constraints. There were also barriers related to organisations' competency or capacity for change leadership, as well as a general aversion to risk.

Technological advances and increased speed of delivery have meant the public sector has struggled to keep up with customer demand. Service users increasingly want to access ▶

services, make applications and supply evidence online – and at a much faster pace. They expect public sector departments to keep up.

Councils are suffering the consequences of austerity and thus prioritising the funding of statutory service delivery. Although this leaves limited opportunities for technological improvements, technology and innovation offers the chance to streamline services with a view to making savings. Technology is becoming more affordable and laborious tasks are increasingly being replaced – reducing cost and error, improving delivery time and helping to manage risk.

In February 2017 the government released a transformation strategy highlighting a desire to improve data flow between departments and achieve joined-up services. This ambition, along with changing customer needs and financial restrictions on public sector budgets, has led to a mixture of delivery strategies. The public sector has increasingly looked to private sector innovation, exploring opportunities to embed new technology into the delivery of its services.

The opportunity for introducing these ideas and solutions comes with risk. Face-to-face interactions and verification methods have been replaced by online applications and risk profiling. This has led to services and payments being awarded with reduced vetting of applications and/or individuals. The evolution of cyber threats and malware has created the potential for data integrity and security to be compromised. As more data is stored on computers, networks and cloud services, there is an opportunity for cyber criminals to steal and share valuable data or access services and payments.

Cyber security is the responsibility of all public sector staff. Systems for the protection of the organisation, its partners and its customers should be embedded within the organisation's policies and procedures. Collaboration between IT, senior management and staff should ensure appropriate training to create standard behaviour that minimises the risk of data leakage.

The private sector has delivered advanced technological solutions and services to the public sector. Some of these are procured, managed and run internally while others have been outsourced, creating a lack of control or an inability to adapt, sometimes due to procurement processes or limited contractual terms.

With each solution, delivery model or implementation comes risk, and the public sector has to manage this against its desire to meet digital transformation objectives and risk appetite.

The next stage

Public sector organisations have been on a journey when it comes to digital transformation – one involving key strategic objectives, organisational structures, operating methods and existing technology. They need to foster continuous evaluation and collaboration across departments to ensure the environment for transformation exists.

The sector should not fear technology and innovation but embrace it at every opportunity. Organisations must put digital transformation at the heart of business delivery and ensure appropriate plans are in place to meet key objectives. A programme of education needs to be created that ensures all levels of the organisation understand what digital transformation means and empowers appropriate leaders to take the process forward.

Public sector IT teams need to work closely with corporate leadership, procurement departments and private sector organisations to understand the needs of an organisation, as well as the technology available to meet them. Computer software companies will continue to build smarter solutions that give organisations greater opportunities to transform their operational processes and customer experiences, closing gaps between web, mobile apps and offline engagement.

Cloud-based technology can provide richer user experience and improved remote working. Instead of employees interacting only with members of their immediate team, they will be able to communicate and work with people from different teams – and from around the world.

The public sector should be looking towards more specialised systems and software that uses data analytics. Such technologies and techniques are widely used in commercial industries to help organisations make more informed business decisions, improving operational efficiency and boosting business performance.

Partnering data analytics with fraud prevention and detection tools can benefit the public sector in the fight against fraud and corruption, reducing losses and identifying risk for targeted action. Efforts have already begun in London with the creation of the

'There were some quick wins when authorities first transferred the content of manual files into digital format'

London Counter Fraud Hub, developed by CIPFA to supply data analytics, investigations and a recoveries service for London. Using pioneering technology, the hub analyses data to identify fraud. Unlike traditional data-matching hubs, this is an end-to-end service providing expert advice and operational support around sophisticated analytics.

The inclusivity challenge

Embracing a technology strategy is not without challenges and risks. It is important to understand your customer, ensuring services continue to be accessible to all. Inclusivity is a major consideration when transferring services online; there is a significant risk of alienating older people who may not have the skills to use new technologies, leaving them without the support they need.

A report published by Age UK in December 2015, *Later life in a digital world*, warned that more needed to be done to engage with the 'offline' community. A study found the poorest pensioners were the least likely to have access to online services, and that around four in five people over the age of 75 in the lowest socio-economic groups did not use the internet.

This is having an impact on older people, with many reluctant to claim support. The report estimated that £3.7bn of pension credit and housing benefit was missed each year because people did not know they were entitled to it, or did not want to claim it out of pride or embarrassment. While public sector bodies continue to aim for 100% digital service delivery, many older people prefer to use the phone, creating a barrier to support.

There is also the challenge of integrating the technology into existing infrastructure. The public sector has procured numerous systems from many providers during the rollout of digital transformation, requiring an integration or replacement strategy. Significant investment in application programme interfaces (APIs), specifying how software components should interact, is needed to deliver data sharing and connectivity between devices and programmes.

The public sector has come a long way in delivering digital transformation. However, there is further to go, with challenges and opportunities ahead. The sector should not shy away from these challenges, and should invest in the technology and resources required to lead the technological revolution. I for one will support public sector initiatives that do this, and will be sure to let my local council know they have my support. Via an online forum, of course. ●

'CIPFA identified that only 58% of public service organisations had a digital strategy and less than a third of organisations operated a digital-first approach'

Turn around city

ESSAY
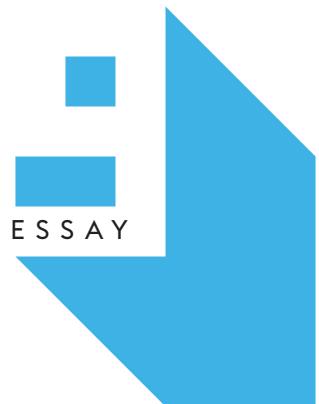
BY JUNE MATTE

The US city of Pittsburgh was forced by necessity to undergo technological transformation. How was it done?

June Matte *is managing director and chief executive of PFM Advisors UK*

DIGITAL TRANSFORMATION can happen at many levels. Pittsburgh, once a thriving industrial city in the US state of Pennsylvania, has been able to successfully reinvent itself by moving away from its old manufacturing past and looking to the future via digital technologies such as robotics, computing and biotechnology.

Pittsburgh's economy was formerly driven by its steel production. It was also historically endowed with strong intellectual and cultural resources, supported by its industrial partners. However, beginning in the 1970s, the steel industry was brought to its knees by stiff competition from foreign steel and the development of mini-mills. Major corporate job creators such as US Steel, Westinghouse, Gulf Oil and Rockwell left Pittsburgh, and many of the ancillary manufacturing activities went, too.

Between 1950 and 2000, the city experienced a population decline of 50%, along with a decline in the property tax base and a significant rise in abandoned property. Between August 1981 and January 1983, unemployment increased from 88,500 to 212,400 – a rate of 18.2%. The population that remained was older, poorer and in need of more city services, with a significantly smaller tax base to support it. By 2003, the city had hit bottom, with its bond rating reduced to junk and a significant structural operating deficit. Pittsburgh was in crisis.

Much of Pittsburgh's renaissance has been driven by research on its university and medical centre campuses, where the seeds for innovation began to grow. However, to harness the digital technology revolution for the benefit of the city as a whole, Pittsburgh had to embrace it at the local government level, too. This meant utilising data and technology to transform the way it did business.

To find its way out of a crisis several decades in the making, the mayor and city council forged a partnership with other civic leaders to try and turn things around – and create an environment that was attractive to new business. They realised that strict fiscal discipline, with broad-based support, would be needed to put the city back on even footing, even if the cuts were difficult.

Leverage and leadership

The mayor's team developed a strategy with four key elements: encouraging bold political leadership that was willing to make hard fiscal decisions; leveraging partnerships with local civic institutions to bring about change across the city; appointing a competent municipal finance team and letting it do its job; and adopting an enforceable financial plan focused on sustainability, with support from the council. The strategy was to be supported by data and transparency. With these building blocks, the city's new finance team set about creating a culture for change.

Pittsburgh was able to transform itself using two very important data-driven tools: a robust budget model and a detailed investment model, driving accountability across the city. It also benefited from the Act 47 process, a state-sponsored programme that gives fiscally challenged communities additional powers and protections while they are in the reorganisation process.

Act 47 requires the development of a detailed five-year plan – a road map back to stability. The plan adopted carries the force of law and includes the appointment of an overseer body to ensure compliance. PFM Advisors played this role for Pittsburgh, initially creating a detailed electronic model of prior years' budget data that was able to project future results under multiple scenarios. We also worked with the city to develop its financial plan, built upon proposed budget and operating initiatives and costed out in detail to provide transparency in making budget cut choices.

Some of its features included: multi-year employee pay freezes; no pension enhancements; economic caps on union bargaining; elimination of operating deficits and revenue enhancements; reduction of the city debt burden; technology improvements; maintenance of adequate fund balance; increase in pension fund contributions; increase in capital budget investments; and maximisation of economic development opportunities.

PFM also helped set up a variety of quantitative performance measures, especially for salary, benefits and financial benchmarks. Significant savings were driven by re-engineering business processes, creating efficiencies across the operation. We also worked closely with the city and its surrounding county to merge information technology services and create a single platform for financial reporting. This saved money on software licences, hardware expenditures and staffing.

By introducing technology across a broad group of departments, the city was able to drive operational efficiencies, as well as provide much-needed transparency for the changes that were being implemented. The full costs and benefits were evaluated for each alternative under consideration, as well as ease of implementation, to determine which actions would be most effective.

While the finance team focused on cutting the budget in line with its reduced revenue base, the city leadership recognised it needed to invest in economic development as the catalyst for change. It could not merely cut its way to prosperity. The management team developed a strong urban regeneration agency, the 'URA', whose mission it was to drive investment in the economy. The role of the agency was to assemble, prepare and convey sites for major mixed-use developments, providing a portfolio of programmes that include financing for business start-ups, location and expansion, housing construction and rehabilitation, and home purchases and improvements.

Tools for change

The city also needed the technological tools to track change. An important one was the Geographic Information System (GIS), which provides access to digital maps of the entire Pittsburgh conurbation. To assist with transitioning abandoned industrial buildings and vacant lots, efforts were focused on streamlining city planning processes, making information on all aspects of the planning process available online to potential development partners.

Along with financial modelling came the creation of a detailed performance measurement system. The city needed hard data to measure its success at reaching its ambitious goals. The best way to measure performance was to impose accountability based on a social investment model. To this end, the p4 initiative – which stands for people, place, performance and planet – was launched in 2015. It aims to establish Pittsburgh as a 'city of the future' by creating a new sustainable, innovative and inclusive model for development and design.

The investment model focuses on the development of 500 acres across the urban core of the city, including public land, former industrial properties and abandoned properties. It is one of several projects advancing the p4 initiative's vision.

The directive from the city mayor at the start of this project was to 'create a quantifiable system of metrics that would inform and improve decision-making on public investments in development projects'. Around 12 priority focus areas were developed for improvement – the 12 performance measures. Each measure contains a set of metrics that provides a comprehensive evaluation tool for consistent assessment of real estate development projects in the city of Pittsburgh, advancing sustainable and equitable development practices

The purpose of the social investment model was to prioritise real estate investment according to the p4 components, utilising performance data to measure progress. Each measure contains quantifiable metrics or alternative methods for evaluating the degree of project benefit and impact. Their use by multiple funding entities and investors will result in a consistent method for evaluation and prioritisation of project investments throughout Pittsburgh. ▶

'By 2003, Pittsburgh had hit bottom, with its bond rating reduced to junk and a significant structural operating deficit. It was in crisis'

Policy and system changes and commitments will be instrumental in creating a comprehensive strategy for successful implementation. Some of the areas under consideration for priority action include: community development; workforce development; economic investment in distressed areas; housing and land reform; expansion of mobility options; action on pollution and energy standards; and incentives for innovation and improved design. As the p4 team has stated, 'the measures reflect a first step toward transformational change in how we plan and develop for the benefit of all'. Data and transparency are driving this process.

Pittsburgh has been able to reinvent itself from a traditional manufacturing economy to one that is technology-based by leveraging the partnerships of its academic community, business and political leaders to forge a new economy. It has driven digital transformation by taking advantage of its intellectual resources to attract biotechnology, clean energy, robotics and high-tech industry partners such as Google into a city that had been on life support.

Local government, by stepping up its own technology game, has acted as a catalyst to create an environment where this new economy could thrive. It has created operational efficiencies and savings by introducing technology applications across city government and embracing strong, transparent fiscal management.

Embracing technology in both city planning and operations has made all the difference when it comes to attracting and keeping technology-driven partners that will ensure the city's continuing economic transformation for years to come. ●

'The city leadership recognised it needed to invest in economic development as the catalyst for change. It could not merely cut its way to prosperity'

CIPFA

The Chartered Institute of
Public Finance & Accountancy

Planning for the next generation of public finance professionals?

Find out how the CIPFA Professional Accountancy Qualification (CIPFA PQ) continues to deliver expertly-trained public sector finance professionals, with the most relevant skills and practical experience. And with apprenticeship levy funding, it's now more accessible.

www.cipfa.org/apprenticeships

Intelligent finance

This is the eighth in a series of *PF Perspectives*, produced by CIPFA and *Public Finance*. They are designed to stimulate discussion on key public finance and policy issues. These essays, by leading public sector practitioners and experts, examine how digital technology is transforming public financial management and the delivery of public services