PUBLIC

HELPING STARTUPS TRANSFORM
THE PUBLIC SECTOR

STATE OF THE UK GOVTECH MARKET

UNLOCKING THE POTENTIAL OF STARTUPS TO SOLVE PUBLIC PROBLEMS

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PUBLIC

IN A SURPRISINGLY SHORT TIME, THE WHOLE WAY THE STATE ENGAGES WITH ITS CITIZENS WILL BE DIFFERENT

CONTENTS

FOREWORD

Across the world, the modern state is undergoing an extraordinary transformation. A new generation of technology is changing the way a nation - or, indeed, a local government - collects taxes, delivers services, distributes welfare, maintains security, and more. In time, and perhaps a surprisingly short time, the whole way a state engages with its citizens will be different. Driving this change is the rise of GovTech - new technologies applied to public services and specifically designed for government purposes.

The phenomenon is global. And just starting. Denmark has shown the way with NemKonto, a citizen's account for payments to and from government. Its e-Identification scheme, NemID, gives every citizen a secure means of personal identification online. Out of a population of little more than 5 million people, 4.8 million already use NemID. Yet it did not exist five years ago. This one story shows what an innovative government can do and just how quickly the public will respond.

On the other side of the world, in the Indian state of Karnataka, the government has rolled out a database to manage millions of land records. Farmers need a copy of their landownership to apply for a bank loan. Before the service, the process was long, costly and very painful. Now that it has become digitised, it is hugely popular even with semi-literate farmers. Similar examples can be found from Albania to Zambia.

A number of factors are driving this transformation particularly fast in the UK, including:

- Rising expectations by citizens
- Continued budgetary pressures
- Devolution and a new wave of Metro Mayors
- Demographic shifts inside public administrations
- The end of legacy IT systems, which are overly centralised and non-responsive
- The availability of new technologies like artificial intelligence, cloud computing and data science
- Government commitment to greater SME spend and GovTech innovations

The UK has an extraordinary opportunity to seize this emergent market. Government, at central and local levels, should aim to make the UK the best place globally for GovTech businesses to start and operate. And the UK should then help the best GovTech companies to expand to become major international players.

Why the UK? Government reforms, especially since 2010, have seen the UK lead the world in government digitisation. No other country currently combines size of market with such a ready public acceptance of the digital world. Devolution is now bringing opportunities to cities such as Birmingham, Manchester and Bristol, which are showing the way for technology-enhanced approaches to public service. Even the UK's departure from the EU may herald opportunities, as it will require, to a short deadline, the complete reformation of certain services including rural payments and border control

The GovTech market is estimated to be worth $400 billion globally. Research in this report estimates that **the UK GovTech market could be worth £20billion by 2025.** This would make it one of the most important digital sectors of the economy. The breadth and diversity of GovTech entrepreneurship shine through in our **Public 100 list**, which is the most comprehensive list of UK GovTech firms published to date. Companies are now looking to transform everything from traffic management and dentistry to the way welfare is paid and flood protection is managed.

This report charts the GovTech opportunity. We show how exciting the GovTech landscape already is, with many premier startups vying to transform public services. We showcase the successes that businesses have already achieved at central and local levels of government. We debunk the concern that purchase cycles for government are an impregnable barrier. And we seek to show where the most encouraging developments are, across different layers of government.

WE ESTIMATE THE **UK GOVTECH MARKET TO BE £20 BILLION BY 2025**

The picture that emerges is extraordinary. But as Ron Bouganim of the US GovTech Fund says, "it is still a market hiding in plain sight". With this report we hope to reduce the opacity which often shrouds the public sector. We encourage more entrepreneurs to consider opportunities in GovTech while helping policy-makers, buyers and investors see the depth of the market. The end result could be spectacular. Few countries will get the opportunity to transform large swathes of public-sector services in the way that we will in the UK.

We founded Public to help technology startups transform public services. We intend to make the UK a pioneer of digital transformation. And by doing so, we will improve the quality of our society and the lives that we lead. We hope that in this report you will see what we see – and that you will seize the opportunity.

Good reading,

Daniel Korski & Alexander de Carvalho
Co-Founders of Public

EXECUTIVE SUMMARY

Demands on government services are increasing at an extraordinary pace due to a growing and ageing population, ever-greater security concerns, budgetary restraint, and higher expectations from digitally-savvy citizens. People demand more of the state, as they have become accustomed to smartphone-empowered lives. Yet the state, unlike private enterprise, is struggling to innovate. Introducing new technologies, coupled with new business models, will enable governments to transform public services by providing intelligent solutions directly to individual citizens at the same time as reducing or avoiding costs and increasing efficiencies.

THIS REPORT:

Gives a history of the UK GovTech market from 1997 when Tony Blair first introduced e-government initiatives through to the most recent Government Transformation Strategy in 2017. These reforms have made the UK a market leader. Though the pace of centrally-led digital reform has slowed recently, the overall direction of travel is undoubted, not least as local governments, from Glasgow to Leeds, have picked up central government slack.

Provides a comparison between the £6.6 billion UK FinTech and UK GovTech markets: Funding of GovTech companies grew significantly in 2016. Just as in the early stages of the development of UK FinTech, the UK GovTech sector will benefit from a fertile environment for further growth. UK has the right commercial ecosystem of talent, capital and policy. It also has the market - with increasing demands by its citizens and the obsolescence of its expensive legacy IT systems.

Showcases the breadth of the UK-wide GovTech ecosystem which is emerging: Some exciting companies in our review include the surveillance-enhancing algorithm developer, Calipsa, the midwife/patient advice platform, Ask the Midwife, the all-in-one online healthcare platform for homecare, Cera and Pockit, a company using new technology to provide bank accounts geared towards supporting the most impoverished and marginalised in society.

Forecasts that the UK GovTech Market will reach £20 billion by 2025: This will be fuelled by a renewal of large IT contracts, a shift towards procurement from SMEs, investment into emerging technologies applied to public needs, and by the rise of companies whose products enhance not only the lives of the individual but also have impacts which more generally permeate society. The UK is well placed to take up the mantle as the world's leading GovTech hub.

Lists the Public 100 - the most comprehensive list of lists of UK GovTech firms: To help create a clearer baseline of the GovTech market in the UK, we have created the most comprehensive list to date of 100 product-led GovTech companies. This list reveals that companies that are helping government to deliver direct services – aspects of health advice or the issuing of licences, for example – represent 38 percent of the survey when measured by the size of their balance sheets, making it one of the areas that has seen the greatest level of investment. However, the largest segment of our GovTech list is made up by comprises supporting the way governments administer themselves – run databases, manage their staff, protect their systems, for example. Companies focused on engagement with citizens, infrastructure and regulation make up a smaller part of the GovTech market. These companies now stand ready to grow more rapidly.

Shows that public sector sales cycles have become significantly less complicated: Progress over the past few years has been considerable. Based on our research, these once-exasperating sales cycles now last on average between 2 months and 18 months. Three recurring themes that have helped "winners" to succeed in the sales process are (i) compliance;(ii) a clear route to market; and (iii) a sense of mission.

WHAT DOES GOVTECH MEAN?

FOR CITIZENS GovTech will improve the quality of public-sector delivery across healthcare, transport, decision making, citizen engagement, and more. Indeed, every facet of everyday life in the relationship between citizen and the state will hinge on these new technologies.

FOR POLICYMAKERS GovTech presents a unique opportunity to accelerate productivity and create jobs. It gives UK the chance to boast a world-leading government, capable of making data-led decisions which can then be executed efficiently to better serve the public.

FOR BUYERS across various levels of government GovTech may initially present a steep learning curve, as they discover the potential of technologies to achieve policy outcomes. Companies such as Apolitical are helping to bridge this gap. Over the longer term we will have more transparent buying which will lead to cheaper solutions for the public purse. Regional collaboration - the effect of devolution – will bring a burgeoning GovTech market across the nation.

FOR STARTUPS GovTech presents a rapid growth market. But more importantly, it gives entrepreneurs a chance to make a real difference in the society we share. Quite simply, it will make the UK a better place to live. The wealth of entrepreneurial and engineering talent in the private sector is enormous.

FOR INVESTORS GovTech companies represent an untested opportunity. However, the size and scope of the needs they will address and the potential returns this will offer should prove very compelling. The GovTech sector is nascent, but for this very reason it represents a compelling opportunity for VCs to gain early access to companies with the right tools to leverage the power of technology to deliver profitability and therefore truly disrupt in a sector that has historically struggled to produce VC-like returns. GovTech companies will also appeal to those investors looking to promote and expand on the growing theme of investing in companies that do right not only by their shareholders, but also by the society in which they operate.

FOR POLITICAL LEADERS The opportunity to bring together policy outcomes, delivery and data-driven evaluation in new and ground-breaking ways, whilst stimulating a nascent and vibrant market in the UK is powerful and should remain a priority for the foreseeable future.

BREXIT AND THE GOVTECH MARKET

Predicting the impact of Brexit on any market has not become easier one year on from the referendum. For the UK's GovTech market, it is clear that Brexit represents both opportunities and risks. If Brexit leads to a larger re-think of governmental systems, from rural payments to customs arrangements and identification, then it must inevitably drive a significant adoption of new technologies and new suppliers.

If leaving the EU leads to a re-think of procurement policies and regulations, with a preference given to UK firms, then there will undoubtedly be a short-term boost to a sector which is still very UK based. However, if this leads to reciprocal barriers for UK startups seeking to enter European markets, then HMG would have to redouble its support for GovTech startups to succeed in non-European markets.

If Brexit impacts the economy – and crucially, investor confidence – then all digital markets, including the GovTech market, will suffer. Access to European capital, not least from the European Investment Bank, is also important to the UK's VC market and any shortfall will need to be made up.

Access to European talent is crucial to the UK GovTech market. We need only look at the Public 100 list to see how many of these companies have been built by immigrants from Europe and beyond. The drive to build the skills of young people in the UK is welcome, but will not yield results in the timeframe required for the UK to ensure that it becomes the world's GovTech hub. So any impact on the access to skills, whether because of quotas, bureaucratic obstacles or even just the tone of public discourse, will be detrimental to the UK's GovTech market.

THE UK GOVTECH MARKET

CHAPTER 1

HISTORY

Government IT has traditionally been dominated by a few large suppliers. But today, after years of reforms, government departments, agencies and local authorities have a mix of 'Big IT' solutions and legacy software, middleware, software-as-a-service and open source products. To illustrate, the top 10 suppliers of ICT and business process outsourcing (BPO) services made up just 39 percent of the market in 2015, compared to 53 percent in 2013. In any other market, such a rapid disruption of the main players would have made significant headlines.

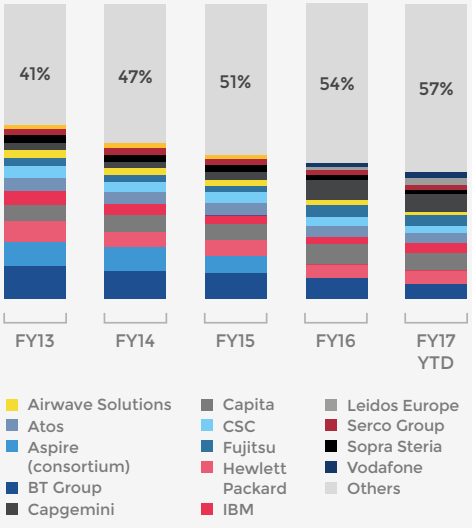
The trend is clear. The market will continue to be favourable to GovTech startups - and for the following three reasons:

First, successive governments have taken an active interest in promoting government spending on startups and SMEs. By 2020, the government has committed to spending 33 percent of its procurement budget on small and medium enterprises, up from 27 percent in 2015. This commitment will not stop.

For Central Government procurement alone this presents a huge opportunity. Between 2011 and 2015, annual Central Government procurement decreased cumulatively by 1 percent[1]. Assuming this continues to 2020 and that the SME spending target is achieved, Central Government will procure £14 billion of goods and services from SMEs by 2020. A significant proportion of this will be GovTech spend.

Second, budgetary constraints are driving the GovTech sector as governments look for technology which can reduce costs, whether directly through automation, through performance enhancement or through cost avoidance. This requires a fundamental redesign of services. As citizens expect more 24/7 online services and the demographics of the UK shift towards an older and larger population, the delivery of low-cost and modern services becomes increasingly important.

Proportion of Government ICT & BPO procurement spend going to top suppliers (%), FY13-FY17YTD



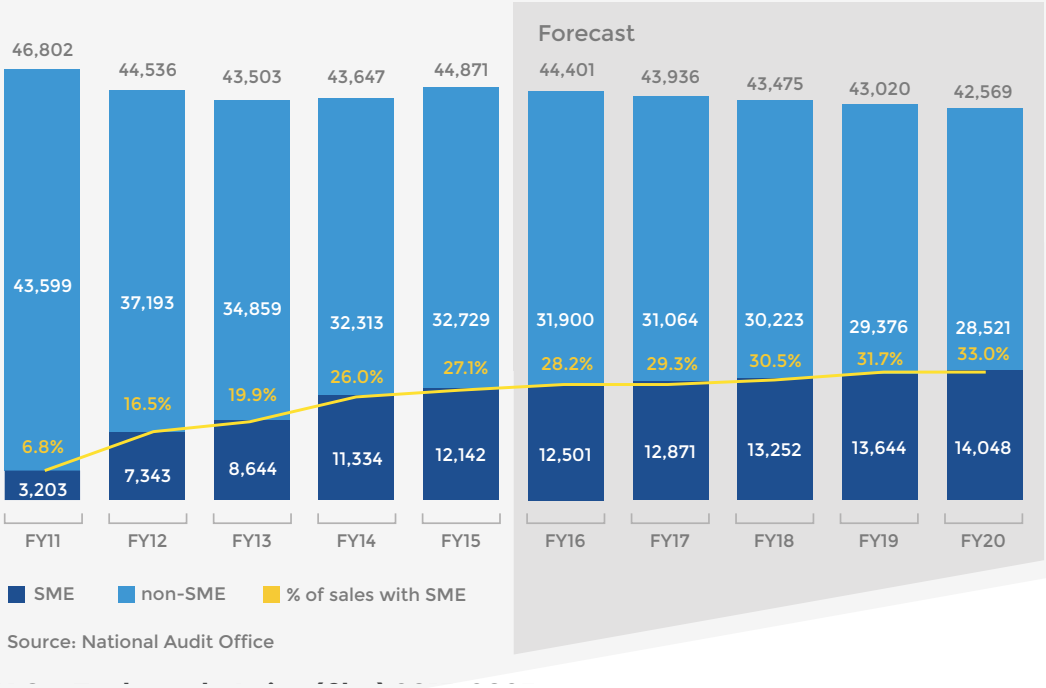
Source: Porge Illuminator

And here newer and smaller firms, being more innovative, have the advantage.

Lastly, the Government is now providing a clear policy direction in favour of GovTech through a range of strategic documents, from the *Industrial Strategy* (January 2017), through the *Government Transformation Strategy* (February 2017) to the

1 National Audit Office (2016). Government's spending with small and medium-sized enterprises.

Government procurement spend split by SME and non-SME (£m), FY11-FY20F



Source: National Audit Office

Digital Strategy (March 2017). Tech-focused institutions like the Government Digital Service (GDS), Tech City UK, Innovate UK, Tech North, the Open Data Institute and the network of Catapults increasingly help GovTech firms. And the Five Year Forward View of the NHS in England is driving fresh thinking around the integration of sizeable NHS budgets. Devolution is similarly creating the demand for a much smarter delivery of local services.

Sectors of the GovTech market

There have been many attempts to categorise the GovTech market, including the introduction of new abbreviations such as "CivTech" or "RegTech". We counted at least seven different categories of GovTech companies currently in use; and there are undoubtedly many more. To us, GovTech refers to cutting-edge technology products developed for - or tailored to - public services. It is probable that this new set of transformative products will disrupt the traditional B2G model and will likely come from startups and SMEs

To segment the GovTech market, we use a simple system of five different sub-sectors, each one centred on a specific public-service role: administration, delivery, regulation, participation and infrastructure. This system applies to the GovTech sector as it is broadly defined, meaning all technology used for public services delivered by central governments, local authorities, or agencies. Or indeed, whether they are delivered by the private or third sectors. Due to the relative maturity of the market, we have chosen to take balance sheet size as an appropriate benchmark to compare companies to one another.[2]

Administration refers to companies that help governments administer themselves, such as HR systems and cybersecurity. This subsector accounts for 40 percent of companies listed in the Public 100.

Delivery, the second largest segment in our list, represents 38 percent of the Public 100 companies. Delivery-centred firms focus on the day-to-day distribution of public services including healthcare, education, and enforcement. Education software, which helps to improve children's standardised test scores, is also part of this subsector..

The **Infrastructure** segment refers to companies developing hardware such as sensors and digital controls which are used to deliver government services. One successful example of infrastructure GovTech is the use of sensors in green waste bins, which allows local councils to collect waste when bins are full rather than on a pre-determined schedule.

2 Government's' application of technology is not limited to their IT expenditure. 'Technology' also pertains to emerging trends such as data analytics, big data (storage, transmission, and analysis), AI (machine and deep learning), and robotics. It also important to differentiate between IT and Digital Transformation, which is akin to business transformation of the government and the way it meets public needs. The third sector consists of companies who are values driven and do not exist to make profits, they are neither private nor public entities.

The **Participation** segment is relatively small, consisting of just 10 percent of our Public 100 list. This category includes community forums, e-petitions, and other tools that promote social inclusion. Participation could consist of a service as simple as Represent.me who crowdsource polls and can be used by public sector bodies and citizens alike to present real-time feedback.

Lastly, the **Regulation** category includes areas where the state regulates behaviour but does not deliver services directly, like AML checks. Companies in this category make up just 4 percent of the Public 100 list. Government, like the private sector, does business with many individuals whether through procurement or other means. In the future, we believe this sector will make up a larger proportion of our list as governments take on an increasing amount of business with smaller, private companies.

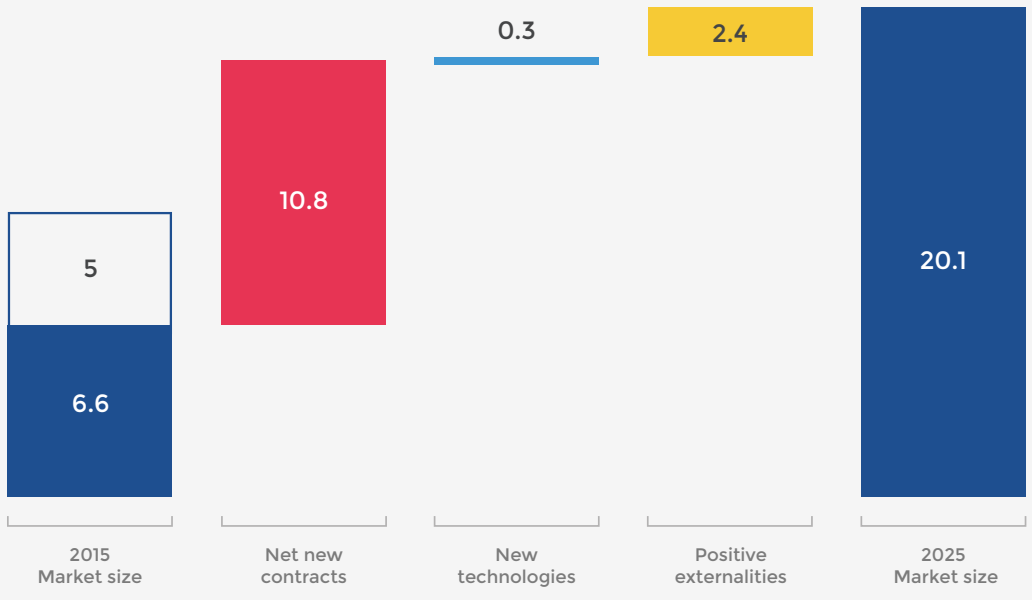
MARKET SIZE, FORECASTS AND TRENDS

Taking the established definition of GovTech above, two estimates emerge for the size of the market in 2015. A lower estimate of £6.6 billion is the total value of 3,054 contracts granted in that year, based on Tussell data. An upper estimate of £12 billion is achieved by including government spend on IT & BPO expenditure from Porge's Illuminator. We estimated that the UK GovTech market will reach at least £20 billion by 2025, using the following methodology:

The value of **New Contracts** was estimated based on known expiring IT contracts as well as a forecast for annualised spend over a period surrounding 2025. This is a more accurate approach than only considering a forecast for 2025 as contract lengths are not bound to annual cycles.

Our estimate for the value of **New Technology** was obtained by looking at investment in innovation and potential growth up to 2025. We obtain a number of £0.3 billion, though this is likely an underestimate because it considers only existing investments initiated by government. It does

UK GovTech market size (£bn) 2015-2025



not forecast further innovation or include an exhaustive list of new technologies, which are largely private sector.

Positive Externalities relates to existing companies who are not selling into government but whose existence has a positive social impact. We measured this using investment into innovation in public sector impacting technologies and realistic predictions of its returns, giving an estimate of £2 billion.

A more detailed discussion of positive externalities, defined as all positive benefits to a third party from the delivery of a good or service, can be found in Appendix 1, alongside a broader explanation of our methodology.

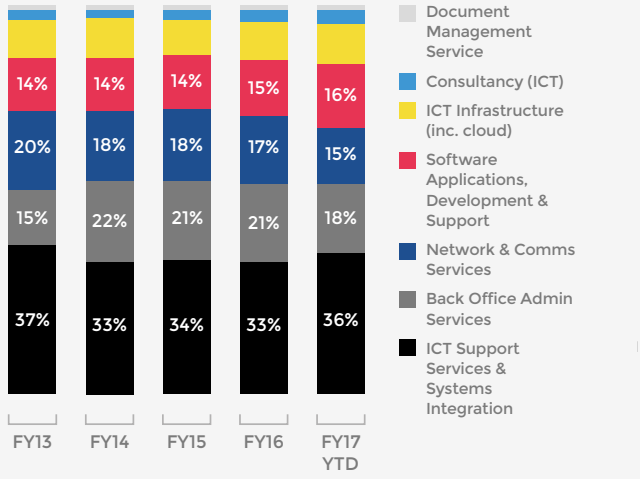
It is worth noting from data below that Central Government spent about £12 billion in the SME sector in 2015[3], with a wider public sector procurement spend of roughly four times that size. This suggests significant headroom for the market to expand further than our conservative estimates above. This point is reinforced by the Cabinet Office's Crown Commercial Service (CCS) increasing goals for the public sector doing with business with SMEs.

DIVIDENDS FROM GOVTECH

For the public sector, the introduction of new technologies has enormous potential to free up back office resources which can be transferred to the frontline - whether to A&E clinics, fire departments or schools. In addition, back office resource, staffed with better technology, will be able to provide more effective outputs. Further, new technologies have the potential to help the public sector avoid costs altogether through preventative, data-driven interventions. For example, reducing the number of people who come to A&E because they have been given more accurate information online, or improving attendance in schools through online peer-to-peer support networks.

While nominal spend on type of ICT and BPO procured by government has changed year on year, the proportion has varied very little in the past

Proportion of ICT & BPO spend by category of spending (%), FY13-FY17YTD



Source: Porge Illuminator

five years. This provides a level of certainty for new Cloud and SaaS providers looking to make bids in the next replacement cycle of IT systems, such as Nervecentre. These companies will be the real frontrunners in the bidding process as they provide specialist software which lowers cost, requires no upfront investment, and can be upgraded or scaled immediately when necessary.

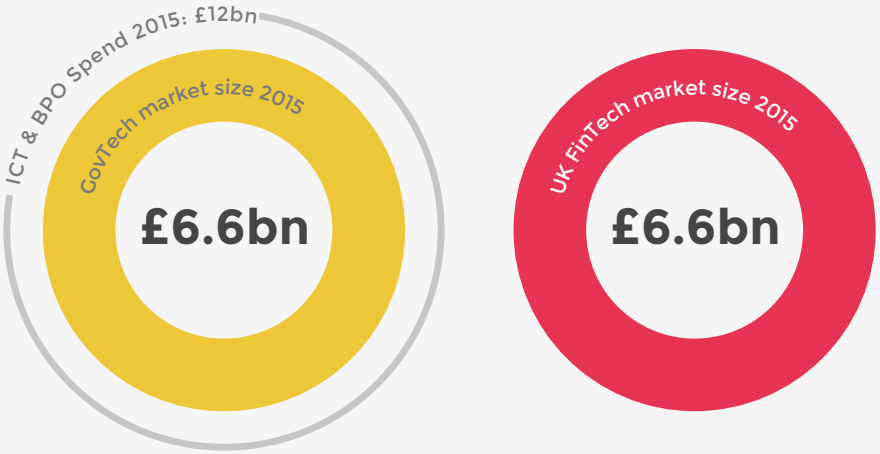
In 2016 in particular, £4 billion was spent on IT Support and Systems Integration. Our research suggests that a successful migration from on-premise solutions to cloud based solutions could realistically save 25 percent of costs.[4] [5], It therefore follows that Central Government could save £1 billion just by migrating to the cloud. And this represents only a fraction of the GovTech market's potential.

3 National Audit office (2016). Government's spending with small and medium-sized enterprises.

4 SAP (2016). Cost Benefits of SAP HANA in the Cloud. Accessible at http://sapinsider.wispubs.com/Assets/Blogs/2016/January/Cost-benefits-of-SAP-HANA-in-the-cloud. "Forrester conducted a cost-benefit analysis of migrating to a SAP HANA implementation would save 37 percent over just 3 years".

5 Microsoft (2017) The best public cloud for SAP workloads gets more powerful. Accessible at <https://azure.microsoft.com/en-gb/blog/the-best-public-cloud-for-sap-workloads-gets-more-powerful/ Microsoft claims that annualised 20 percent savings from switching to Azure from on-premise SAP solutions. We have taken 25 percent to remain relatively conservative.

Market comparison (£bn)



Source: CBInsights data, KPMG, Porge Illuminator

GLOBAL GOVTECH HUB

In 2016, the UN e-Government Survey ranked the UK number one globally for both e-government development and participation[6]. The UK is the most viable candidate to be a global GovTech hub.

While countries like Denmark, Estonia and Singapore are blazing trails in digitising their economies and administrations, the UK GovTech sector is unique in terms of its scale, history of legacy core systems and huge networks of infrastructure.

This means that the UK has the greatest opportunity to solve the complex challenge of public sector digitisation. A solution developed in the UK could be effectively applied in other countries with relative ease. London has always been a world-leading financial services centre, and when FinTech developed as a major sector, the UK successfully became a global FinTech hub.[7] One can make direct comparisons between the past growth of FinTech and the current GovTech market dynamics.

Considering its relative maturity to GovTech, the FinTech and GovTech market sizes are comparable in revenue terms. In 2015, Ernst & Young (EY) valued the UK FinTech market at £6.6 billion.[8] FinTech is helping banks to make their operations ever more lean and is enabling them to transform their business models to maintain competitive advantages. GovTech not only enhances public sector delivery, but does so while simultaneously reducing operating costs. The point is clear: becoming the world's GovTech hub would be of greater long-term value to the UK versus being a global centre for FinTech. A new and diverse universe of startups would be created which would flourish, internationalise and provide new jobs whilst simultaneously driving down public sector costs.

VENTURE CAPITAL **INVESTMENT INTO GOVTECH IS ACCELERATING**

6 UN Department of Economic and Social Affairs (2016). UN E-Government Survey 2016. Accessible at https://publicadministration.un.org/egovkb/en-us/reports/un-e-government-survey-2016>

7 EY (2014). Landscaping UK Fintech Commissioned by UK Trade & Investment

8 EY (2014). Landscaping UK Fintech Commissioned by UK Trade & Investment

VENTURE INVESTMENT

A good barometer of interest in an industry and its future growth potential is the level of venture investment being deployed. This particular type of investment seeks returns over a longer time horizon, generally supports more nascent and consequently riskier companies or markets, and in technology sectors focuses on disruption and innovation. The graphs shown suggest that GovTech may be on the cusp of becoming the next major sector of growth..

Venture Capital investment into GovTech is accelerating. The deal value in Q1 2016 has rapidly increased to a point where it almost equals the total figure for 2015, and deal value has more than quadrupled between Q1 2015 and Q1 2016. These are both strong signals that investment is beginning to flow into GovTech. To see what lies in store for UK GovTech companies we can look to the latest valuations assigned to large US GovTech companies such as NextDoor ($1.1 billion)[9], OpenGov ($100m)[10], Accela ($400m)[11], Palantir ($20 billion)[12]. This space should be watched closely as a new generation of key players emerge in the next few years creating immense growth in the sector.

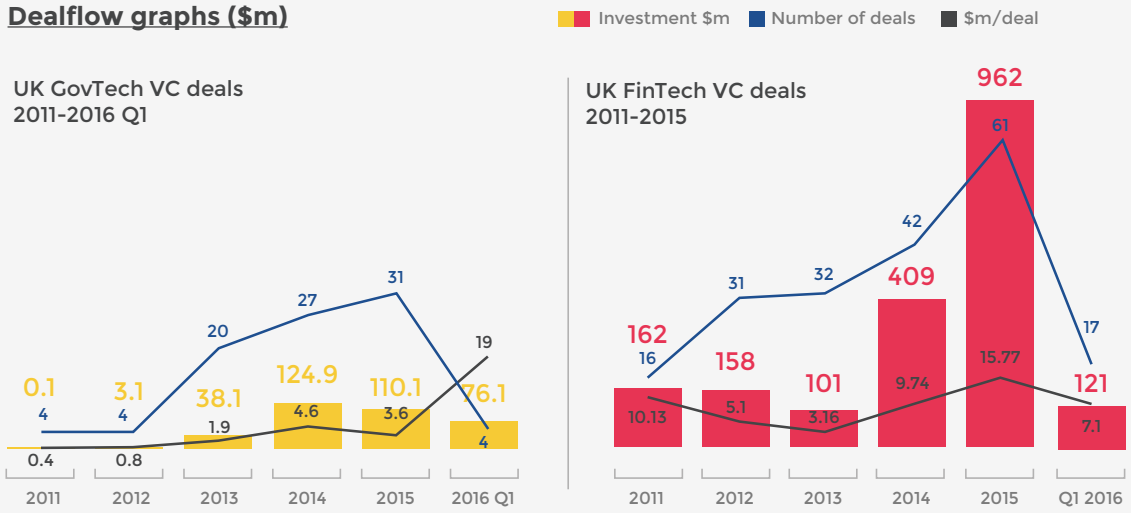
9 Government Technology (2015). What's Next For Nextdoor After $110 Million Investment?. Accessible at http://www.govtech.com/local/Whats-Next-for-Nextdoor-After-110-Million-Investment.html

10 Venture Beat (2015). OpenGov raises £25m from Andreessen and others at £100m+ valuation, Marc Jacobs joins board. Accessible at https://venturebeat.com/2015/10/15/opengov-raises-25m-from-andreessen-and-others-at-100m-valuation-marc-joins-board/

11 GovTech.com (2015). Landmark investment shows GovTech market heating up. Accessible at http://www.govtech.com/budget-finance/Landmark-Investment-Shows-GovTech-Market-Heating-Up.html

12 TechCrunch (2017). Palantir has raised £880 million at a $20 billion valuation. Accessible at https://techcrunch.com/2015/12/23/palantir-has-raised-880-million-at-a-20-billion-valuation/

Dealflow graphs ($m)



Source: PwC, CBInsights, KPMG

DRIVERS OF GROWTH

This report has touched on the fact that successive governments have increasingly focused on digital transformation. Most strikingly, the Chancellor of the Exchequer, Philip Hammond, said in his June 2017 speech at Mansion House that the UK's future success in the midst of Brexit would "involve the deployment of new technology" in how Government works.[13]

We have also mentioned that citizens are demanding a fundamental change in the way they engage with governments. It follows that the public sector will need to become more tech-enabled as its citizens do. What is clear in this landscape is that change has already begun to manifest itself. The question is not whether governments will embrace digitisation, but rather how and on what timescale? How fast and deep will this adoption be?

We have a sufficient set of conditions in place for the UK to emerge as the world leader in GovTech. The UK has a unique combination of proximity to talent and knowledge, access to capital and investment appetite, as well as a deep regulatory and political system, all of which will help to accelerate the digitisation process.. This is precisely how the UK became a world leader in FinTech, starting in London and then expanding to other cities such as Manchester, Newcastle, Edinburgh, Leeds, and Bristol. Newcastle has become a hub for GovTech since HM Revenue and Customs (HMRC) based its new digital headquarters there in 2014. Opencast software, a company based in Newcastle and run by entrepreneur Mike O'Brien, has provided a wide variety of solutions including a renewable energy data analytics platform to help cut the costs of electricity generated by wind farms. The platform helps to identify malfunctioning equipment, which cost the UK offshore wind industry an estimated £150 million in 2012 alone.[14]

Another parallel to draw is that of the challenges banks and government face with their legacy systems.[15] These systems are expensive and obsolete. But there are barriers to moving everything to the cloud, such as incompatibility, security, and issues with source data. In the next replacement cycle, many public-sector organisations will shift to the cloud, abandoning the expensive and outdated on-premise solutions with which they have historically operated. A 'no change' approach to legacy contracts is increasingly viewed as an outdated perspective. When the NHS Business Service Authority (NHSBSA) brought on a new contract for the prescription payment service, it realised savings of up to £36 million between 2011 and 2012 alone - reliance on the new contract was 90 percent cheaper than its previous legacy contract.

The implications of legacy systems for GovTech are that once the government successfully recognizes the issue of vendor lock-in, it can try to separate as the NAO puts it "business application from physical software" making it possible for startups and SMEs to contract with HMRC, DWP, the NHS and other departments despite their current inability to manage the huge contracts that exist for cumbersome core services like income tax. Some problems may be solved more creatively and efficiently by smaller companies - for example, staff scheduling and management, issues which Rotageek, seeks to solve through its SaaS technology. Or Cera, whose platform includes functionality which assists caretakers with elderly patients by giving them advice based on care records created through past interactions with Cera. One might argue that Cera could operate even better if it integrated with NHS digital patient records - which will be digitised by 2020.

As long as security protocols are followed, cloud solutions are less exposed to cybersecurity risks, which has become a greater concern in the wake of ransomware attacks such as the 2017 attack on the NHS.[16] Legacy IT, as in the case of the NHS, is often unsupported by its current or previous supplier, who may not have provided software updates for years. Large, antiquated IT systems require upkeep and maintenance on top of the huge initial outlays for installation. This increases operating expenditure and drains cash from front-line delivery.

13 Computer Weekly (2017). Chancellor Philip Hammond reveals the Brexit challenge for digital government. Accessible at http://www.computerweekly.com/blog/Computer-Weekly-Editors-Blog/Chancellor-Philip-Hammond-reveals-the-Brexit-challenge-for-digital-government

14 ORE Catapult (2014). SPARTA. Accessible at https://ore.catapult.org.uk/our-knowledge-areas/operations-maintenance/operations-maintenance-projects/sparta/

15 National Audit Office (2013). Managing the risks of legacy ICT to public service delivery. Accessible at https://www.nao.org.uk/wp-content/uploads/2013/09/10154-001-Managing-the-risk-of-legacy-ICT-Book-Copy2.pdf. We define legacy ICT as systems and applications that have been operationally embedded within a business function but superseded by newer and often more effective technologies or changed business needs, for example the need to deliver a new policy or deliver a service in a different way.

16 National Cyber Security Centre (2016). Implementing the Cloud Security Principles. Accessible at https://www.ncsc.gov.uk/guidance/implementing-cloud-security-principles

PUBLIC 100

CHAPTER 2

THESE COMPANIES ARE **TRANSFORMING THE PUBLIC SECTOR**

While the UK GovTech market has been growing, there has been no comprehensive overview of the market's most dynamic companies. This has contributed to a lack of attention to the market and the comparatively low, though fast-growing, venture capital investment in the sector.

To help create a clearer baseline of the GovTech market in the UK, and to show investors and buyers what exists, Public has curated the most comprehensive list of 100 GovTech companies to date. These are companies that we believe are beginning to transform the public sector.

We built the data from UK procurement contracts, DueDil, Crunchbase, Angelist's "Government Innovation" list as well as desktop research and interviews. We looked at five qualitative and quantitative variables when constructing the company list including leadership, company structure, company size, innovation, and impact on public services. This survey is intended to chart the UK's GovTech startups. We used the European definition of SME as criteria for companies included in the survey: less than 250 employees, an annual turnover not exceeding €50 million and an annual balance sheet not exceeding €43 million. In the UK, an SME must satisfy any two of the following three criteria: having less than 250 employees, less than £25 million in annual turnover, and gross assets of less than £12.5 million. The full methodology can be found in Appendix 2. The list is not exhaustive; there are many GovTech companies that we have not named. But the Public 100 list presents the UK's most interesting product-led GovTech companies which have traction in the public sector. These are the companies that are transforming (rather than merely fine-tuning) government practices. Crucially, we have excluded firms that may well transform services in future but are not yet at the starting line. We hope to include them on an even better list next year. And we have deliberately focused on startups and SMEs. For us, GovTech refers to cutting-edge technology products developed for or tailored to public services, and these are most likely to be created by startups and SMEs whose offerings will disrupt traditional large suppliers.

The list highlights a number of key characteristics of the UK's GovTech market:

The greatest segment of the GovTech market comprises those companies supporting the way governments administer themselves - run databases, manage staff, protect their systems. Driven by the cloud migration agenda and an increased focus on cybersecurity, this area has grown significantly in the past few years, and will continue to be a high-growth area in the foreseeable future. This is unsurprising; the first step in transforming the sector will be in enhancing the current capabilities and improving the way the system runs in and

of itself. This is the first barrier to progress. These businesses tend to be lean, generally software-led companies that have effective balance sheets (as evidenced by the graph displayed) and, if managed in line with the wider software industry, will generate high gross margins.

GovTech companies are helping government to directly deliver services - policing, healthcare, licences - through new channels or by enhancing current mechanisms. They represent 38 percent of the list of companies and 29 percent of the total Public 100 balance sheet - the second largest category. The immediate benefactors of transformation to delivery will be front-line public servants and citizens who engage with their government. For example, look at Cera, a healthcare marketplace focused on homecare which enables a patient to order not only the treatment and prescriptions they need, but a whole host of auxiliary services - such as food or taxi services - which enhances value to the user, brings together disparate elements of the healthcare value chain, and alleviates pressure on front-line nurses and care workers.

Companies in the GovTech market that focus on infrastructure represent a relatively small part of the market, at 8 percent, but represent the highest percentage of the balance sheet of the overall list, namely 31 percent. Infrastructure here reflects companies implementing hardware, such as sensors or controls which are used to deliver public services. Infrastructure changes are inherently higher risk and require heavy investment in advance. However, this also reflects the potential returns on investment if the implementation of new infrastructure is successful. What we mean by infrastructure here is the physical hardware that supports the usage of innovative software and enables fundamental changes in the world that can be done by public servants. We use classic examples such as sensors and digital controls and drones which could be used for a whole host of purposes once implemented, but as mentioned are a heavy investment and therefore a bigger risk.

Citizen Participation is still a developing area for government. It accounts for 10 percent of the Public 100 but only 2 percent of the cumulative balance sheet and includes community forums, e-petitions, and other tools that promote social inclusion. The vast majority of the Participation companies in the Public 100 were set up in the last 3 years and use the very latest technology to enhance the way the state can encourage citizen participation and feedback.

Companies offering services to bolster Regulation are similarly an area of growth. In light of regulation and the focus on security, transparency, and accountability in the public sector, companies which enhance the level of due diligence the public sector can perform on suppliers and on other parties will become increasingly important and these companies will experience fast growth in the future. In particular, Regulation companies showed strong traction in 2015, perhaps due to the upcoming GDPR legislation which will come into effect in May 2018. Two of the fastest 10 growing companies in the Public 100 are regulation focussed. Companies like Agvesto are applying technology to Agriculture, or PassFort which is working in the AML and KYC space,highlight the breadth of industries that GovTech encompasses.

Looking at the retained earnings of our GovTech businesses by segment we see improving profitability across the board, even in administration (which cumulatively as a segment made a loss in 2014). This suggests that the industry is gaining traction and that business are unlocking some of the value within the public sector.

Over half of the Public 100 are based in London, although their customers are spread throughout the UK and internationally. Outside London, there are GovTech companies based in all areas of the UK, with a particular strength in the Northern Powerhouse such as Ideagen who are one of the fastest growing companies in the Public 100, and Answer Digital who are revolutionising user experience in the health and social care market. We look forward to discovering more companies across the UK as we continue to chart the UK GovTech landscape.

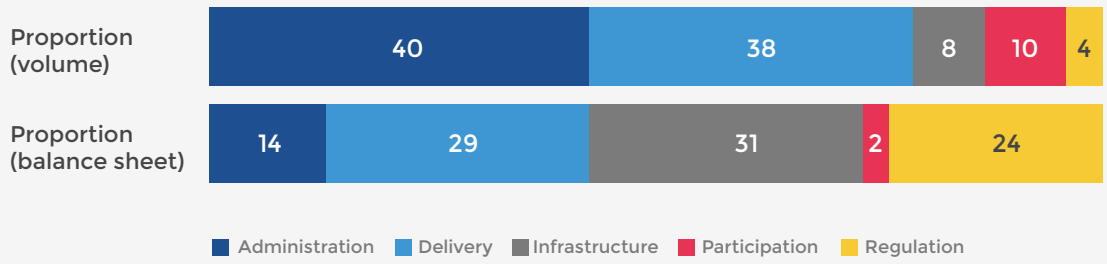
Public 100

Delivery Administration Participation Infrastructure Regulation

- AccuRx ★
- Adzuna
- Artifax Software
- Ask the Midwife ★
- Bramble Effect
- C3ia Solutions
- Calipsa
- Castleton Software
- Cera
- Clinisys Solutions
- Connexica
- Contego
- Cypad
- Digital Connextions
- Dr Foster Intelligence
- Echo
- Envitia
- Firmstep
- FutureGov
- Immersive Labs
- JAC Computer Services ★
- Jontek
- Keysoft
- Kompli
- Little Bridge
- Nervecentre
- Network Locum
- Onfido
- Open Cast Software
- Open Cosmos
- Pinipa
- Rotageek
- Scientia
- Sedicii
- Servelec Corelogic
- Showmyhomework
- Tactuum
- Totalmobile ★
- Affinitext ★
- Answer Digital ★
- Amt-Sybex
- Cognitive Logic
- Calvium
- Cloud Oko
- Connect Internet Solutions
- Cyberlytic
- DarkTrace
- DataCentered
- Deep Sky Blue
- Exegesis Spatial Data Management
- Factmata
- FlyingBinary
- Govcoin
- I-Connect
- Imperial Civil Enforcement
- Intruder
- Joyride
- Khipu
- Kpmd IT
- Lima Networks
- Liquidlogic
- MDS Technologies
- Obillex
- Open Objects
- Patients Know Best
- Privitar
- Q-Solution
- Recordsure
- RipJar
- QuickCode
- Sec-1
- Skillslogic
- Softwire
- SQR Systems
- Squirrel Financial Wellbeing
- The Nostrum Group
- Yoti
- Zen Educate
- Apolitical ★
- Delib
- Firesouls
- HealthUnlocked
- Mind of my Own
- Neighbourly
- Novoville
- Represent.me
- Spacehive
- Yoomee Digital
- Becrypt
- Citymapper ★
- Ebeni
- Esteem Systems ★
- Lamasatech
- Neurofenix
- Optimity
- Social Telecoms
- Agvesto
- Ideagen ★
- PassFort
- Xihelm

★ Top 10 fastest growing Public 100 companies

Volume and value of companies in Public 100 by sector, FY15 (%)



ADMINISTRATION

This is a category of GovTech companies that power the way governments, whether central or local, administer themselves. Companies in this category are used by more than 1.5 million non-frontline public sector workers and are crucial to the functioning of the state[17]. It is a segment of the market which has recently been transformed by a number of developments, the most important of which have been the introduction of cloud services and the increased importance placed on cybersecurity.

Cloud services are on-demand computing resources over the internet, generally on a paid subscription basis.[18] The 'Cloud First' policy, originally published in 2013, mandates that during any procurement process, public sector organisations should "consider and fully evaluate potential cloud solutions first – before they consider any other option." Companies like Network Locum, Pinipa and Cloud Oko in the Public 100 list embody the trend towards flexible cloud services.

This is a trend that will only pick up pace. As departments seek to deliver more digital services - for example, the NHS commitment to digitise all patient records by 2020 - there is likely to be even greater growth in this segment. [19] But this comes with a number of challenges. Insufficient in-house skills and a lack of knowledge about the safety of cloud-based services could hamper growth. Perhaps more importantly, how data will be regulated and allowed to flow across borders will be an important part of the Brexit negotiations.

17 The Guardian. (2017). UK voters are being sold a lie. There is no need to cut public services. Accessible at https://www.theguardian.com/public-leaders-network/2015/feb/12/uk-voters-cut-public-services-amazon-spotify-uber.

18 IBM (2017). What is Cloud Computing?. Accessible at https://www.ibm.com/cloud-computing/learn-more/what-is-cloud-computing/

19 New York Times (2017). UK Health Service Ignored Warnings for Months. Accessible at https://www.nytimes.com/2017/05/12/world/europe/nhs-cyberattack-warnings.html

DARKTRACE

Darktrace's cybersecurity technology leverages advances in machine learning and probabilistic mathematics to mimic the self-learning intelligence of the human immune system. The artificial intelligence algorithms provide real-time visualisation of network traffic and are able to detect and autonomously respond to emerging cyber-attacks and other threatening anomalies. The technology has been implemented at No. 10 and the company has on many US defence contracts.

So far, Darktrace have completed nine contracts with the public sector ranging from government departments such as county councils to health authorities. Total public sector sales amount to over £4.1 million.

The introduction of the GDPR in May 2018, as well as anticipated judicial decisions on current legal terms and bases for the transfer of data, will also determine the pace of growth of GovTech companies in this segment.

The second driver of growth in this part of the GovTech market has been the increased focus on cybersecurity. The UK has been at the forefront of developing new cybersecurity technology thanks to a developed ecosystem, not least inside government and in the financial services sector. Cambridge in particular, is a fertile ground for cybersecurity startups including Public 100 companies like Bitsight Technologies and DarkTrace. Cylon, a London-based cyber accelerator, has also helped scale a number of companies on the list including Hook, Intruder, Cyberlytic, High Side, SQR, and Immersive. In the *National Cybersecurity Strategy 2016-2021*, the

government announced an investment of £1.9 billion with the aim of boosting cybersecurity and "protecting critical infrastructure, deterring our adversaries and developing whole society capabilities."[20] In addition, the UK exports an estimated £1.8 billion of cybersecurity technology according to GCHQ.[21]

DELIVERY

Delivery is a category of the GovTech market focused on the direct delivery of services - from doctors and police officers to employees in job centres and small vital groups such as those responsible for flood management. The segment accounts for 38 percent of companies on our list (but 29 percent when measured by balance sheet strength) making it one of the areas in GovTech which has attracted very strong investment. There are over 4.2 million UK employees who operate on the frontline delivering public sector services.[22] Companies who in particular deliver innovative mobile platforms and payments technology will enhance the ability of these civil servants to perform and meet the needs of their citizens.

One startup, Govcoin, has piloted with the Department for Work and Pensions in a scheme that allows welfare claimants to open virtual jam jars for various expenses and receive their benefits instantly, which are recorded on a decentralised public ledger using blockchain technology. If Govcoin can help government reduce errors from welfare payments, it could potentially save £3.5 billion annually, which is the amount the government overpays due to fraud, claimant error, and official error.[23]

NERVECENTRE

Nervecentre provides a mobile platform to hospitals to help manage workflows. The company provides a range of services including electronic whiteboards that allow doctors to monitor patients' vitals from their phones, mobile task management ensuring that clinicians can communicate with each other about patients, and mobile "handovers" that allow doctors to share information about patients with other doctors and nurses with greater ease.

Nervecentre is a bootstrapped business that is approaching £10 million in annual recurring revenue and works with over 30 NHS trusts.

The UK is increasingly mobile, with 125 mobile phone subscriptions for every 100 inhabitants.[24] This is leading to increasing demands for smart public sector delivery. For example, social workers are now using third party apps to communicate with at-risk children. A company called Echo allows users to make requests for new medication through its app. These requests are then sent to an NHS GP for approval. Lastly, there is a significant influx of innovative healthcare and education software companies. Among our Public 100 companies, look at accuRx, which reduces the negative externalities of antibiotics by keeping track of prescriptions in real time, or at Little Bridges, a company that helps children learn language skills through creating interactive profiles or "avatars" online that allow them to communicate with other children.

20 HM Government (2016). National Cyber Security Strategy 2016-2021. Accessible at https://www.ncsc.gov.uk/content/files/protected_files/document_files/National%20Cyber%20Security%20Strategy%20v20.pdf

21 UKTI (2013). Cyber Security- The UK's approach to Exports. Accessible at https://www.gchq.gov.uk/sites/default/files/Cyber_Security-the_UKs_approach_to_exports.pdf

22 Guardian (2015). UK votes are being told a lie. There is no need to cut public services. Accessible at https://www.theguardian.com/public-leaders-network/2015/feb/12/uk-voters-cut-public-services-amazon-spotify-uber

23 City AM (2016). Govcoin's co-founder Robert Kay explains why his firm is using blockchain to change the lives of benefit claimants. Accessible at http://www.cityam.com/250993/govcoins-co-founder-robert-kay-explains-why-his-firm-using

24 CIA 2017). The World Factbook. Accessible at https://www.cia.gov/library/publications/the-world-factbook/geos/uk.html

INFRASTRUCTURE

The infrastructure category of the Public 100 list accounts for 8 percent of the companies. Growth in this area will primarily come from three areas: transportation, data storage and embedded technology (public realm Internet of Things). Transport for London (TfL) has been on the cutting edge of innovation with its work on open data, cycling superhighways, and pilot projects. One company, Calipsa, has been working on a pilot with the Department for Transportation (DfT) to add an additional layer of artificial intelligence to automate the surveillance of camera feeds, which is estimated to have saved up to £3.2 million. Joyride, one of the Public 100 startups, has worked with transport authorities to collect data through their sensors and software on where parents cycle with children to help design safer bike lanes for cyclists. As cities like Manchester and Birmingham take greater control of their transport systems, there are likely to be new commercial opportunities for startups in this segment of the GovTech market.

Data storage is another key area for innovation. Data storage infrastructure will need to develop to support the requirements from new technologies and services. While larger companies have traditionally dominated this market, new solutions and companies will emerge in this area as several large, high-profile IT contracts wind down. We believe this could be a large and profitable segment of the market in future.

Embedded technology in the form of sensors in the public realm will enable the monitoring of traffic flows, poor air quality, walking and cycling. Data gathered from this will be the foundations for new policy solutions by city government tackling issues which are growing in importance to citizens and firmly on the political agenda.

CITYMAPPER

Citymapper, which has raised £32 million, from a number of notable investors including Facebook board member Yuri Milner, and Benchmark Capital, is often considered a consumer rather than GovTech company. However, Citymapper is on the cutting edge of a larger trend of consumer companies like Airbnb and Lyft looking at government as a vertical.

Citymapper released a new smart bus route called the CMX1 earlier this year based on accumulated journey data. Citymapper's software will rethink current bus routes and provide new and better routes, augmenting London's public transport efficiency.

PARTICIPATION

Participation is still a developing area of GovTech. It refers to engagement between governments and citizens - whether this is voting, complaint procedures or plebiscites. Today it accounts for 10 percent of the Public 100 companies. This category of GovTech companies covers a wide range of purposes. Some companies are bridging social media and government services to give deeper and more immediate insight into citizen sentiment. While most platforms facilitate connections between citizens, or between citizens and government, we have seen other applications that connect civil servants, local community leaders, and even government contractors.

Public 100 company, Apolitical, is a social media platform that connects civil servants around the world who are tackling similar problems. It provides case studies of what is being tried elsewhere. It makes connections between experts and their government counterparts who can help officials in their work. They have contracts with the UK Cabinet Office and the governments of Australia and the UAE, and are supported by the European Union. Represent.me is a representative democracy platform enabling online deliberation and data gathering on government or community proposals to assist better civic decision-making. Clients include unions and public agencies.

NOVOVILLE

Novoville is great example of how citizen engagement has moved into the 21st century. A recurring concern has been the inability of governments to communicate with citizens and vice-versa. This could be anything from failing to alert certain residents that their property may be flooded or simply asking for feedback via an online survey for a planned project.

Novoville helps to bridge the gap between citizens and their local governments. With the help of a mobile app, citizens can file reports or requests to their council, express their opinion for the future of their neighborhood and get updates on important events. All of the requests are forwarded to the council dashboard in real time. This helps councils assign and resolve requests faster and more efficiently. Any update on the progress of your requests is communicated back to the phone of the citizen.

An impressive 78 percent of requests citizens submit through the app are settled within one week, generating more efficient outcomes. Novoville is already operating in 40 cities across Europe.

REGULATION

In the near future, regulation is set to become an area of growth in the GovTech market. After the 2008 financial crisis, the mood in the UK became less favourable towards light-touch regulation resulting in stronger legislation regarding financial services. Companies and governments are taking due diligence more seriously. We have seen a number of startups fill demand for products that facilitate compliance in the public and private sectors.

A common problem faced by both government and the financial sector is how to update operational processes to meet changing regulations. PassFort, a UK-based company, has developed a Smart Policy software platform that enables businesses to create programmable versions of paper-based compliance policies. PassFort's first application of the technology targets AML and KYC regulations.

Another heavily regulated area is security and the use of citizen data. In the past, the UK Government has struggled to design better policies and use big data due to privacy concerns. Privitar, another GovTech company, is building a software product that enables its customers to use sensitive, personal or confidential citizen data. Using Privitar's products, policy makers will be able to assess the effects of public policy with more evidence-based quantitative methods and an uncompromising approach to data privacy.

RECORDSURE

RecordSure offers a SaaS platform that helps government organisations securely record, store and analyse sensitive audio information. In a nutshell, RecordSure listens intelligently to conversations between agents/interviewers and customers and automates the assessment of the conversation using artificial intelligence, natural language processing and machine learning. In the past, governments have tended to use manual taping, which is a far less effective and efficient method of recording conversations and, until now, have had no way of analysing those interactions.

The Home Office utilises a bespoke version of RecordSure's Capture solution to streamline the recording and storage of interviews required for legal purposes. Previously overburdened by the physical storage, manual retrieval and perishable format of tapes/DVDs and paper forms, RecordSure enables Home Office audio interviews to be stored securely in digital format and easily retrieved alongside integrated electronic forms. As a result, not only does RecordSure enable automatic audit trails of record creation, amendments and access in compliance with DPA and GDPR legislation, but the Home Office can also access business intelligence through a broad and sophisticated Management Information suite.

PROCUREMENT

CHAPTER 3

Many innovators and investors still shun the GovTech market for fear of long purchase cycles, which drain company resources and staff morale. But the reality is far better than many realise. Governments will always have to jump through various bureaucratic hoops in a way that many private companies will not have to. That is only right and proper; tax-payers money needs to be spent wisely and the ever-present risk of collusion must be guarded against. But years of sub-optimal outcomes, and a reliance on large vendors who over-charge and struggle to innovate, have prompted many government departments, both centrally and locally, to devote more energy to improving the procurement process.

From 2010 onwards, the efforts of Francis Maude, the then Minister in the Cabinet Office, Chief Procurement Officer Bill Crothers and GDS head Mike Bracken helped drive significant steps towards demystifying the procurement process. There are now greater opportunities for smaller firms, not least with the introduction of the government digital marketplace G-Cloud. The commitment to buy 33 percent of public products and services from SMEs is a particularly important change, which will benefit GovTech startups.

Sales cycles today are significantly less complicated than even a few years ago. And while the UK still operates under an EU and OECD framework - and will presumably do so in the foreseeable future - this provides plenty of leeway to make changes happen. From HMRC to the DVLA, digitally-capable leaders have brought scores of startups into government to transform services. Most departments have also brought in senior CTOs from the private sector, who may be better equipped to understand how to benefit from the new capabilities startups can bring to government. And the Crown Commercial Service, the UK government's procurement agency, is changing the way government buys products. It will hopefully build on the success of G-Cloud.

Based on Public's conversations with 25 companies at funding stages ranging from seed to series C and with aggregate government contracts from just £2,000 to £4.4 million in the UK, sales cycles - which we define as proof of concept to production - took between two months and 18 months. And we have identified three recurring themes that have helped "winners" to succeed in this sales process. These are: (i) compliance; (ii) route to market; and (iii) "missionism." Our evidence suggests it is possible to shorten government sales cycles to as little as three months depending on the size of contracts and the government entity.

Procurement Process

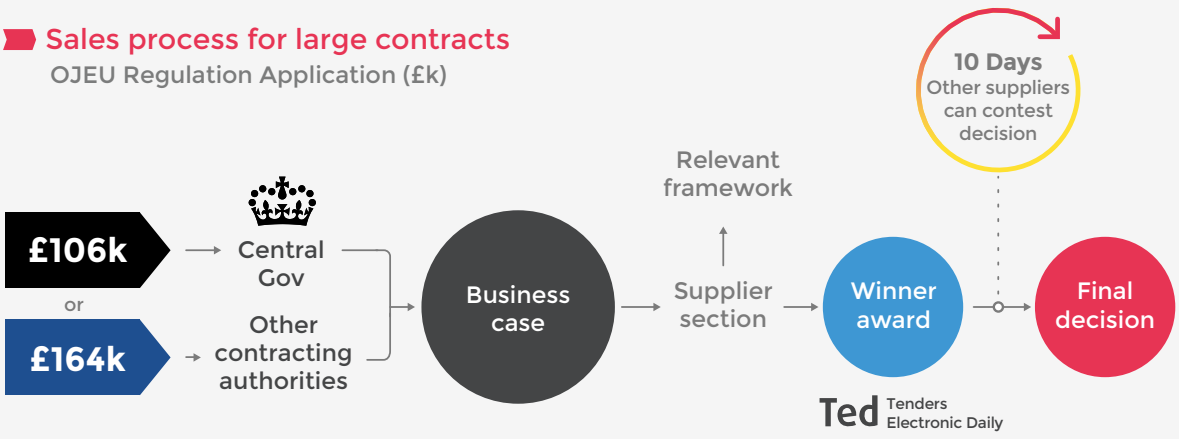
4 routes to market

Sales process for small contracts

For lower thresholds, the OJEU offers some suggested procedures

Sales process for large contracts

OJEU Regulation Application (£k)



HOW THE PROCESS WORKS

The cycle can be broken into four sections: (i) pre-procurement work; (ii) the tendering and awards phase; (iii) post-acceptance negotiations and delivery scoping in the contract; and (iv) supplier management.

There are four routes to market when selling to government. There are two direct sales methods which can take the form of either (i) a free-trial format; or (ii) a sale to a systems integrator (SI) that has an existing contract or that sits upon a framework agreement. Alternatively, companies can sell directly to government through a pilot or funded competitions. (These pilots tend to be of smaller contract value and are therefore less onerous on both buyer and seller during the procurement phase.) Going through a framework agreement is the fourth and most onerous form of sale. This is a necessary procedure for more complex projects which require thorough diligence on the part of the government to establish the strongest bidder. For these last two routes to market, we present a detailed procurement roadmap showing that for smaller value contracts, the process is much simpler, with none of the Official Journal of the European Union (OJEU) restrictions. It is only when contract values rise above £164,000 for local authorities and above £106,000 for central government that OJEU regulations kick in and a corresponding tendering process is required.

Government sales cycles

Long government sales cycles are often described as the most challenging barrier to entry in the GovTech market. But they can also provide a competitive advantage by keeping potential competitors (who may be less ready, less motivated or less informed) out of the bidding process.

Length of sales cycle

Based on conversations over the past six months with 25 companies between seed and series C funding stages who have sold between £2,000 to £4.4 million to the UK government, the case is more optimistic. The sales cycle, which we define as proof of concept to production, took between two months and 18 months. We have identified three recurring themes that have helped successful bidders to overcome hurdles and succeed in the GovTech space including: **compliance, route to market, and "missionism."** We define "Missionism" as as a sincere desire to improve society. Our evidence suggests that it is possible to shorten government sales cycles to as little as three months depending on the size of contract and procuring governmental entity.

IT IS POSSIBLE TO SHORTEN GOVERNMENT SALES CYCLE TO AS LITTLE AS THREE MONTHS

Competitions, open calls and pilots

Government is increasingly adopting new approaches to meeting citizen or service needs. CivTech 2.0, supported by the Scottish Government, is perhaps the leading example of an applied challenge/open call approach to the GovTech sector. Rather than offering specific requirements for tender, CivTech invites entrepreneurs to offer innovative solutions in a government-backed programme.[25]

In other instances, government may be open to free trials or pilots. There are two reasons for offering a free trial. First, software companies who have low implementation costs (e.g. SaaS) should offer trials for free. Second, free trials may make sense if the solution is a very new approach to a public sector problem (e.g. accuRx, a company which reduces negative externalities from antibiotics through working with clinics). There are exceptions, for example if implementation costs are high, most companies do charge for a more formal pilot. Due to the dearth of guidance available a standardised pilot value is difficult to quantify.

25 For more information please see: https://civtech.atlassian.net/wiki

Systems integrators (SIs): a simple route to market

Systems integrators offer a sustainable strategy for international expansion, regulatory compliance, and sales. Some startups choose to sell directly to an SI, which helps them generate scale and achieve public sector delivery credibility. The benefit to SIs is the ensuing ability to offer innovative and cutting-edge technology as part of their proposition to government without the need to build such tools in-house. In city government, London Ventures is a partnership between the private sector (EY acting as an SI) and London Councils, aimed at co-designing and scaling-up a cohort of SME-developed services across the capital's 32 boroughs.

FRAMEWORKS: the most common route to market

A framework agreement acts as a preferred supplier list: public sector bodies will often only procure from companies who are suppliers listed on the framework. The Crown Commercial Service (CCS), which is the body offering procurement services to the public sector, has many active frameworks, but the most used framework for technology-based companies is the G-Cloud.

G-Cloud is now in its 9th iteration and boasts an SME spend ratio which consistently outstrips public sector averages. Acceptance to the framework is far from a guarantee of work because there are formal tenders for contracts which are put to companies on the framework. However, acceptance is a big step to achieving scale in the public sector arena. There are recurring application windows in which new companies can apply to join the framework.

COMPANIES SHOULD BE ABLE TO SHORTEN THEIR SALES CYCLES AND BECOME VIABLE CONTENDERS IN THE GOVTECH MARKET.

"MISSIONISM": the importance of a social motivation

GovTech companies should be able to demonstrate their social value and ideally in some quantitative manner. The importance of social impact has been driven by the Social Value Act, which was passed in 2013 to mandate that commissioners think about social, environmental and economic benefits before procuring contracts at higher thresholds. Firesouls, a UK-based startup, helps companies comply with the Social Value Act by finding them social community partners with whom to work.

There is room for improvement. Obstacles still exist, mainly around transparency - startups feel "open competition" doesn't exist. In addition, the sales process is made more difficult by an inability to interact directly with relevant government entities (i.e. detailed, technical RFPs are not written by those providing the relevant services). Companies should be able to shorten their sales cycles and become viable contenders in the GovTech market. To achieve this, they will need to (i) strategise around regulatory compliance; (ii) keep in mind implementation costs while offering pilots; (iii) find solid partners; and (iv) prove their social mission.

CONCLUSION

The UK already has an established and world-leading technology sector and is also recognised as a digital superpower. But the competition is intensifying and over the coming years, we will see further challenges emerging. Most recently, larger countries such as the United States, Canada and France have begun following pioneers like Denmark, Estonia and Singapore into the GovTech arena.

The advancement in the digital transformation of UK public services, which began in earnest in 2009, is now entering a new phase as technological capability improves.

These technological improvements, combined with the existing digital talent pool in the UK and the access to capital, should create a golden opportunity for the UK to become the GovTech centre of the world. The stage is set for a boom which will create a large number of GovTech companies and generate a great number of jobs. At the same time, this industry will provide better and cheaper public services. And it will show that the many digital advances of recent years have not just made shopping easier or helped a small metropolitan elite, but have also been able to help solve real societal problems and bring benefits to every segment of our country.

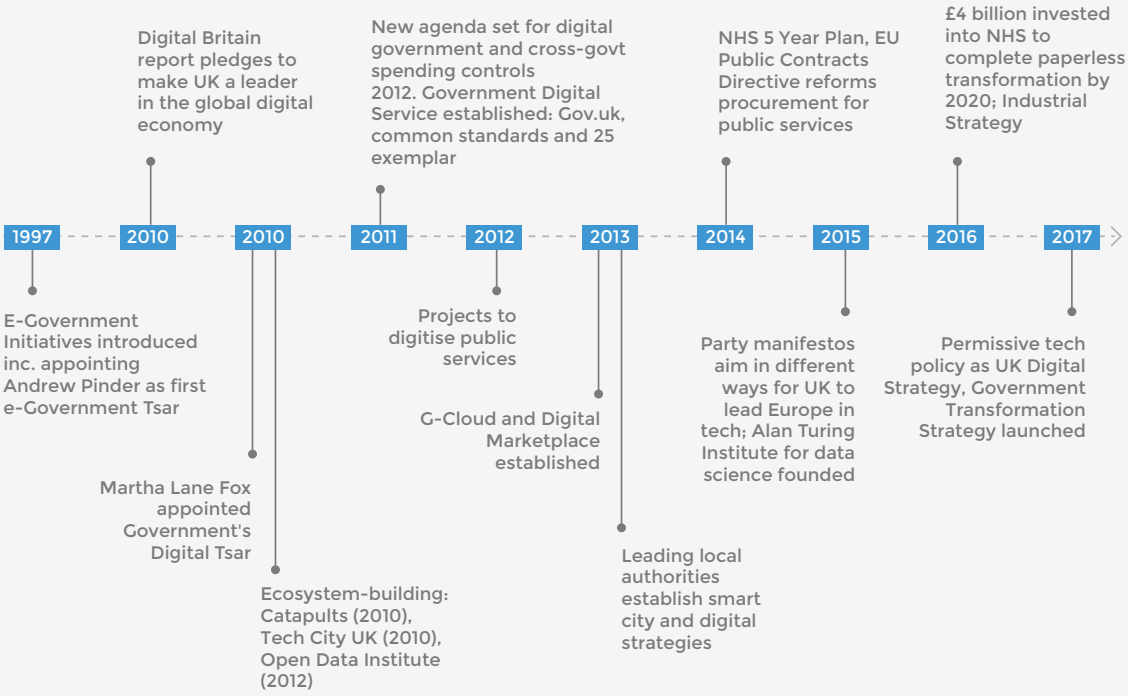
However, policy-makers, from central to local government, must support GovTech if the potential dividends, both commercial and societal, are to be realised. That means finding ways to incentivise the adoption of new technologies within the public sector and proactively thinking about easing the procurement process for startups.

WE BELIEVE THAT **THE NEXT FEW YEARS WILL BE SPECTACULAR FOR UK GOVTECH** AND AS A RESULT FOR THE UK'S DIGITAL ECONOMY

It also means helping GovTech firms export and ensuring that, post-Brexit, GovTech companies can continue to access talent, investment and overseas markets. The process of transformation must not simply see large vendor contracts roll over. When buying the next generation of systems and tools, the government must have the courage and foresight to give startups a fair crack at the commercial opportunities.

The Public 100 list demonstrates a depth in the GovTech market - the list contains many commercially solid, early-stage and high-growth startups that are designing products purposefully built for the public sector. The GovTech market can and will grow and it is already quite impressive. We believe that the next few years will be spectacular for UK GovTech and as a result for the UK's digital economy. Few countries have the kind of opportunity that the UK now has, the full extent of which we hope we have shown in this inaugural report. We will do whatever we can to seize this opportunity and we hope that you - whether you are an innovator, investor, public sector buyer or policy maker - will join us in seizing it.

History of UK Digital Government Reform



MARKET SIZING METHODOLOGY

APPENDIX 1

Although we must be clear that the GovTech market is larger than simply IT expenditure, we believe that a good base to start from is the government spend on ICT. In 2015, this was about £6.6 billion, and if we look at BPO expenditure, we get a combined spend of £12 billion. These numbers are based on Tussell data and Porge data sourced from actual invoices, respectively. This is therefore considered a low estimate of the market, but we believe that prudence in establishing a base is best practice.

In sizing the net new contract opportunities we have looked at annualised ICT & BPO expenditure (again this is conservative when compared to the true value of the market). We took the cumulative growth rate from 2011-2015 and projected this out to 2025. We chose not to adjust for inflation, etc. because we are currently in a high-inflationary period and hence this may over-estimate growth figures. From here we assumed that the government would achieve its desired 33 percent ratio of procurement from SMEs and took this expenditure as the baseline for net new contracts. We took the sum of contracts spanning 2024 to 2026 because it would be incorrect to assume that all contracts fall for renewal within any one year, and therefore it is deemed appropriate to take 3 years as a proxy contract length and sum over three years. In truth many of the larger contracts extend beyond three years and therefore we are again erring on the side of caution here.

One important assumption we made in both the new technologies and positive externalities calculations was the rate of return on investments in innovation. Taking the risk-free rate of return at the end of November 2016 (when a lot of investment was announced in emerging technology [26]) which was 4.53 percent we assumed that for any rational investor to supply capital to a nascent market they would expect to receive at least twice the risk-free rate of return to compensate for the implicit risk of early-stage investment in GovTech. This gives us a projected annual rate of return of 9.06 percent; and this is the rate at which we have compounded capital gains.

In quantifying new technologies, we looked at innovation challenges set by central government as a starting point. Looking at current spend on innovation and forecast to the end of 2017, we compounded the growth of these investments as an asset class out to 2025, giving a valuation of about £300 million by 2025. What is missing here is truly new technology. Further studies will need to spend time understanding which emerging technologies are transforming the public sector and aim to quantify concretely the expected value this could provide, and this how much the public sector would compensate for the service.

Positive externalities of private companies really consist of the value added by companies whose product enhances citizen experience. The archetypal example given here is CityMapper. Most of the companies that we studied do not have revenues. One approach could have been to make some assumptions around the value added back to the economy for time savings, happiness gains, etc. however it was considered more prudent to consider the investment in R&D made by the public sector and by venture capitalists in GovTech. R&D spend is taken from figures published by ONS, venture capital investment was measured from PwC's study into GovTech deals. For venture capital returns we looked at Preqin's global summary of private equity and venture capital and picked the median rate of return actually achieved globally by private capital (12-14 percent), to compound venture investment.

As we expand upon our work more will be done to build a bottom-up model based on industry activity.

26 HM Government (2017). Industrial Strategy. Accessible at https://beisgovuk.citizenspace.com/strategy/industrial-strategy/supporting_documents/buildingourindustrialstrategygreenpaper.pdf

PUBLIC 100

APPENDIX 2

The proprietary data for the 'Public 100' was constructed using an aggregation of UK procurement contracts, DueDil, inbound introductions from the London venture capital community, Crunchbase, and an Angelist's "Government Innovation" list.

We controlled for five qualitative and quantitative variables when constructing the company list including leadership, company structure, company size, innovation, and impact on public services.

Leadership is the least quantifiable category, but we tried to focus on the founding team's track record, company culture, and the calibre of the people in the rest of the organisation.

Structure is simple. We only included companies with a corporate status. No joint ventures or subsidiaries.

Company size was the differentiator for us. This survey is intended to find a way to explore information about startups. For the sake of making the process as simple and streamlined as possible, we use the European definition of SME as criteria for companies included in the survey. The following traits are consistent with the definition: Less than 250 employees; annual turnover not exceeding €50 million; annual balance sheet not exceeding €43 million.

The UK definition differs in that only two of the following three criteria are required: Less than 250 employees; less than £25 million annual turnover, less than £12.5 million on an annual balance sheet

Innovation is consistent with the World Economic Forum Technology Pioneers criteria: "the company must be truly innovative in the development of a new technology or the novel application of existing technology. The innovation or commercialisation should be recent."

Impact on Public Services is difficult to measure. Although there has been progress in econometrics of developing ways to discount future social costs and benefits, we don't have sufficient data to do a comprehensive cost/benefit analysis of the companies on the list. Instead, we have looked at the company descriptions, sought guidance from our advisory board, and come to our own conclusions about potential impact for governments and citizens.

All the companies have either sold into the public sector or have had advanced conversations with a public sector entity.

PUBLIC 100 WITH COMPANY DESCRIPTIONS

APPENDIX 3

	Company	Company description
A	AccuRx	Help clinicians to make more accurate prescribing decisions to improve patient outcomes, reduce costs and safeguard our antibiotics. They use decision support, behavioural nudges and data science to build an entirely data-driven rapid diagnostic.
	Adzuna	Provides smarter search options and powerful data about the job market and searchs thousands of websites in order to remove barriers to access
	Affinitext	Build intelligent document formats which drastically speeds up understanding and managing complex documents such as contracts, policy, legislation, etc. which drives efficiency and cost reduction.
	Agvesto	Uses worldwide earth observation, climate and hyperlocalised data sources to deliver risk related insights for insurance underwriting, trading strategies and execution, and investment support in Agriculture
	Answer Digital	User experience and systems development and integration with a focus on and expertise in Health and Social Care
	Amt-Sybex	Implementation, managed services, and is focussed on a range of products directly impacting socially important areas like energy, infrastructure, and network operators.
	Apolitical	Helps public servants tackle urgent challenges by connecting them to other public servants worldwide who have innovative policies and solutions to offer.
	Artifax Software	Offers cloud and on-premises event planning software which centralises the management and organisation of commercial, cultural and community events.
	Ask the Midwife	The UK's first ever online health advice service, run by Registered Midwives.
B	Becrypt	Helps governments and businesses manage cyber risk, comply with regulation and help organisations optimise the use of new technologies to defend against cyber attacks
	Bramble Effect	Works as a thin prime contractor, enabling best of breed specialist partner suppliers to fulfil public sector projects.
C	Cognitive Logic	Uses technology to enable users to work with big data and query datasets without exposing any sensitive information within the data set.
	C3ia Solutions	Secure ICT, technical programme management and information security services and solutions to security sensitive customers
	Calipsa	Uses advanced algorithms to analyse and derive insights from video surveillance cameras and reduces the burden of camera operation by a factor of 100.
	Calvium	User experience design and implementation to enhance the experience of visitors to cultural institutions.
	Castleton Software	Software and IT infrastructure in social housing and wider public sector.
	Cera	Provides a platform for people to purchase healthcare solutions and wider accompanying services through their mobiles, alleviating the burden on the NHS and tailoring services to the needs of the individual
	Citymapper	Tailored mapping services for cities, optimising usage of public transport. More recently, launching a smart bus route developed using wealth of data collected from user journeys over time.
	Clinisys Solutions	IT build and service solutions tailored to NHS clients
	Cloud Oko	Bespoke cloud software to replace on-site systems in public sector bodies

	Connect Internet Solutions	Website creation and user experience tailored to the needs of the public sector
	Connexica	Self-service business intelligence products and managed services tailored to healthcare and wider public services
	Contego	Technology enabled due diligence and regulatory checks
	Cyberlytic	Intelligent web application security that applies cognitive machine learning & risk analytics to detect, prioritise and prevent web attacks.
	Cypad	Provides tablet and web based solutions for school catering, cleaning, local authorities and other service organisations
D	Dark Trace	Machine learning applied to cyber security to prevent cybercrime before it occurs.
	DataCentered	Public, private, and hybrid cloud systems and services and the first UK SME owned and operated OpenStack public cloud provider.
	Deep Sky Blue	Software solutions for cyber, defence and intelligence.
	Delib	Provides digital democracy platforms to governments and public sector bodies to facilitate online consultation and engagement.
	Digital Connextions	Engagement software which focusses on employability, welfare reform, education and training providers
	Dr Foster Intelligence	Collection, publishing, analysis, and usage of healthcare data and the leading provider of healthcare variation analysis and clinical benchmarking solutions worldwide
E	Ebeni	High integrity systems engineering solutions for safety critical systems including those in the defence industry.
	Echo	Mobile app that helps users order their perscriptions and have them delivered to their door.
	Envitia	Geospatial software and solutions provider, serving defence, government and industry customers all around the world.
	Esteem Systems	Maintenance, transformation, and management of IT solutions to public sector bodies
	Exegesis Spatial Data Management	GIS software provider specialising in providing services, support and solutions to the non-commercial sectors.
F	Factmata	Cutting-edge academic research in natural language processing and information retrieval. They are launching a state-of-the-art fact-checking system using machine intelligence, for statistical claims made in digital media content, such as news articles and political speech transcripts.
	Firesouls	They have built the Social Value Exchange which is an online market place where resources are channeled into solving local problems
	Firmstep	Specialised cloud based CRM software, tailored to public sector needs
	FlyingBinary	Provides an extensive range of data manipulation, storage and analysis services to Public Sector orgnisations through G Cloud
	FutureGov	Designing products, services, and organisational structures for public sector organisations to enable them to transition to a digital service.
G	Govcoin	Uses blockchain to administer welfare payments and decentralise systems to increase transparency and accuracy between stakeholders. Currently trialling a blockchain solution for welfare payments, in partnership with the Department for Work and Pensions
H	HealthUnlocked	Social network for healthcare, connecting patients to one-another.
I	I-Connect	Reduces administrative and non-core burdens involved in social care allowing enhanced delivery or social care to children in need.
	Ideagen	Tailored healthcare, GRC and web content management solutions for public sector organisations

	Imperial Civil Enforcement	Providers of parking, environmental and traffic management systems. Tech enabled integrated end-to-end enforcement solutions.
	Immersive Labs	Built a gamified, social platform that streams cyber labs to end users, enabling them to acquire and develop practical skills that are measured and reported to the business' C-suite.
	Intruder	Proactive vulnerability management for the most exposed systems.
J	JAC Computer Services	Provides a single integrated medicines management solution consisting of pharmacy stock control, e-prescribing and medicines administration, along with associated services and third-party interfaces.
	Jontek	Innovative technology approach to homecare and telecare
	Joyride	Building a bicycle anti-theft device and mobile app so cyclists can keep track of their bikes and report it if stolen. The tracking device connects to free public Wi-Fi in the city so the user never needs to pay for extra data fees, unlike GPS. Further this data can be used by public bodies to view common cycle routes and enhance public transport infrastructure
K	Keysoft	Develops high quality, professional software solutions for traffic management and landscape design.
	Khipu	Delivering a wide range of cybersecurity network, wireless and security solutions, technologies and services.
	Kompli	Uses proprietary machine learning technology, interrogates a wide variety of global data sources on the web for published adverse information on individuals and entities.
	Kpmd IT	Bespoke software development mainly for the NHS, including a Patient Record Request System, and an Infection Control System.
L	Lamasatech	Digital development specialising in digital hardware, interactive solutions, application design, software development and creative content.
	Lima Networks	Designs, implements, and supports IT infrastructure solutiosn and specialise in providing fully Managed Services to public and prviate sector.
	Liquidlogic	Provides software solutions to support integrated care, particularly across social care, health, and in children's services.
	Little Bridge	Social networking site and community, designed especially for young English language learners.
M	MDS Technologies	Provider of cloud infrastructure to the UK public sector including UKCloud, AWS, and Microsoft Azure.
	Mind of my Own	Gives young people an instant and convenient way to express their views, wishes and feelings, and social workers a way to record them using a mobile app.
N	Neighbourly	Social network to connect local projects and community needs with companies ready to help with funds and volunteering programmes.
	Nervecentre	Mobile clinical workflow platform, designed for clinicians, in close partnership with NHS trusts.
	Network Locum	Staffing platform and workplace management software targeting the NHS.
	Neurofenix	Digital therapeutics company dedicated to make neurological rehabilitation enjoyable and accessible to everyone with portable, lightweight and engaging solutions to promote a fast and effective recovery.
	Novoville	Smartphone application for citizens and a sophisticated web dashboard for local authorities to track citizen needs, preferences, and views while automating performance management.
O	Obillex	Early payments solution that enables supply chain transparency.
	Onfido	Proprietary identity and document verification solution powered by machine-learning software to verify that a person is who they say they are as well as criminal and anti-money laundering checks.

	Open Cast Software	Technology company, specialising in building and running the systems that public sector organisations count on to deliver their core services.
	Open Cosmos	Provides public and private customers a one-stop-shop service that covers all aspects of nanosatellite space missions.
	Open Objects Software	Provision of digital products and services to the Public Sector, specialising in Social Care and Health.
	Optimity	Ultra-low latency fibre and wireless network designed in-house.
P	PassFort	Smart policy software platform that enables businesses to create programmable versions of paper-based compliance policies. PassFort's first application of the technology targets AML and KYC regulations.
	Patients Know Best	Patients-controlled medical records system that allows patients to organise, manage, and control their own health care provision.
	Pinipa	Project management platform designed for the public sector.
	Privitar	Software product that enables its customers to use sensitive, personal or confidential citizen data, in a provably privacy-preserving ways
Q	Q-Solution	Independent systems integration (SI) and assurance service to client's software delivery programmes.
R	RecordSure	Provider of monitoring solutions that allow the user to monitor compliance in the financial and public sector.
	Represent.me	Social engagement platform which crowdsources polls and can be used for wide scale social improvement.
	Rip Jar	Developing a strategic intelligence platform with the ability to fuse any number of diverse, structured and unstructured datasets and process, understand and present strategic insights to decision-makers and analysts alike.
	Rotageek	Online employee scheduling software for businesses and the public sector.
S	Scientia	Academic timetabling and resource scheduling software for higher education sector worldwide.
	ScraperWiki/QuickCode	Design and sell products that turn messy information into valuable data.
	Sec-1	Provides professional standard information security solutions to a vast range of clients throughout the public and private sectors.
	Sedicii	Patented technology for identity exchange where parties have trusted identity attributes in their databases that can help others to confirm individual identity details without exposing, sharing, or transmitting any information they hold.
	Servelec Corelogic	Provides integrated care in health, social care, and education through a paperless, mobile workflow software.
	Showmyhomework	An online tool that allows teachers to set homework, students to complete their homework and for parents to track and monitor their child's homework.
	Skillslogic	Bespoke software development company that provides high performance custom software as well as data reporting and analytics.
	Social Telecoms	Telecoms company that provides its products and services to social housing providers.
	Softwire	Delivers bespoke software development, consultancy and software services.
	Spacehive	Crowdfunding platform solely for projects aimed at improving local civic and community spaces.
	SQR Systems	Developing a secure communication platform for a hyper-connected environment of devices, sensors and networks in mobile & IoT

	Squirrel Financial Wellbeing	Banking app for online personal budgeting and a free money management service to those on welfare benefits.
T	Tactuum	Offers a product for clinical resources mobile and web publishing system including interactive handbooks, protocols, guidelines, algorithms, introduction materials, and more.
	The Nostrum Group	Loan software and solutions for banks, finance companies, and retail brands.
	Totalmobile	Make digital workforce management solutions that help people to do exceptional work everywhere they go.
X	Xihelm	Computer vision startup blending together deep learning, computer vision and artificial intelligence to create cutting edge solutions for real world problems.
Y	Yoomee Digital	Designs and builds digital products, services, and experiences to improve the lives of people in poor and vulnerable communities.
	Yoti	Digital identity app that allows you to prove your age, identity and other verified details.
Z	Zen Educate	Simple, streamlined platform for matching education professionals with temporary roles in schools.

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