# AI for Services

## Report 2022

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**Winn Faria**
AI for Services Lead
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# Foreword

AI for Services was established three years ago to support the objectives of the £20 million Next Generation Services Industrial Strategy Challenge Fund programme. This brought together professionals working in accountancy, insurance and legal sectors with high growth entrepreneurs and leading academic experts researching and developing innovative solutions in Artificial Intelligence & data technologies.

We have witnessed continued rapid growth of the network, relevance of its activities and the ability to tap into these fast-growing sectors has shown the readiness of the UK services sectors to adopt, adapt and change, confirming its appetite for using novel technologies to solve business challenges.

It has also validated the UK's strength in Artificial Intelligence and data technologies coming from the flourishing start-up scene and the continued engagement with academic research. The COVID-19 crisis forced many firms' longer-term technology plans to be completed inside a year. The unexpected timing of this global event has only made our work more relevant with firms embracing digital tools and associated tooling in their daily activities to stay open for business.

Businesses are using this newly created work environment with its hybrid, technologically based models as an opportunity to redefine their long-term strategic goals to include specific digital transformation commitments and build future resilience in their activities. One of the network's priorities is to develop a better understanding of the adoption and use of AI and data technologies. The UK's high value services sectors highlighted have identified sectorial strengths and challenges with a view to encouraging greater levels of research and development in this area.

This follow up report treads the path of the first report by providing clear evidence that the size of the opportunity for the UK is far-reaching by quantifying the historical and economic strength of the services sectors and identifying the benefits of AI and data technologies, as well as what they can bring in terms of performance, productivity, competitiveness, and access to service offerings. It also provides comparators to other global economies, highlighting synergies, strengths, and areas for future collaboration. The findings show that the UK is well placed to take advantage of this opportunity with a strong AI and data sector alongside a thriving and well established fintech cluster. The current state of play of innovation in the insurance, legal and accountancy sectors further demonstrates that transformation is already happening albeit at different speeds.

The report reveals the key drivers shaping innovation and the subsequent velocity of challenge areas for the UK to address such as; translating research into commercial applications, access to funding and skill shortages. Looking at the future of the sectors of our study confirms the important role AI & data technologies will play and suggests a well-established acceleration of adoption and investment as a result of the COVID-19 crisis.

AI for Services already counts more than 1,400 leading businesses, researchers, firms and investors coming together to support the transformation of the UK services sectors. It confirms its global leadership position in this area and demonstrates the opportunity and benefits of undertaking research and development. It also acts as a network of networks to share learnings, discuss common challenges and further encourage innovation transfer.

After reading this insightful report, I do hope that you can help us drive positive change in the sector and warmly welcome you to join AI for Services.

## Contents

00
Pages: 4 - 7
Executive Summary

01
Pages: 8 - 11
Introduction

02
Pages: 12 - 19
Innovation: what has influenced and shaped technology in the service sectors?

03
Pages: 20 - 25
The investment landscape

04
Pages: 26 - 33
Global context

05
Pages: 34 - 39
The future of technology in the service sectors

06
Pages: 40 - 45
References

# 00

# Executive Summary

AI for Services, on behalf of the Innovate UK KTN, have engaged London Economics (LE) to produce a second report on the latest trends in technology adoption and use in the UK accountancy, insurance and legal services sectors and their impact on business transformation. This report focuses on the use of advanced and disruptive technologies including AI and advanced machine learning (ML), Internet-of-Things (IoT) and Big Data, advanced cloud computing technology, robots, robotic process automation (RPA) and blockchain. This study provides an overview of the investment and funding landscape and compares the UK services sectors with four other  global services sectors to provide an international benchmark.



AI for Services Report 2022
00 - Executive Summary



## Key trends shaping technology innovation, adoption, and usage within the UK services sectors

**COVID-19 spurred changes in working patterns - the effects of this continue to be felt within the service sectors**

This report finds that the pandemic has spurred the rate of technology adoption in the services sector. While businesses were 'forced' to adopt technology to facilitate remote working at the start of the pandemic, they seem to have embraced digital transformation and adoption of new and advanced technology as long-term business strategies. This is likely due to an increase in awareness and understanding of the benefits and potential of technology by businesses in the services sector.

**Skills availability and leadership commitment remain key challenges in advanced technology adoption by the services sector**

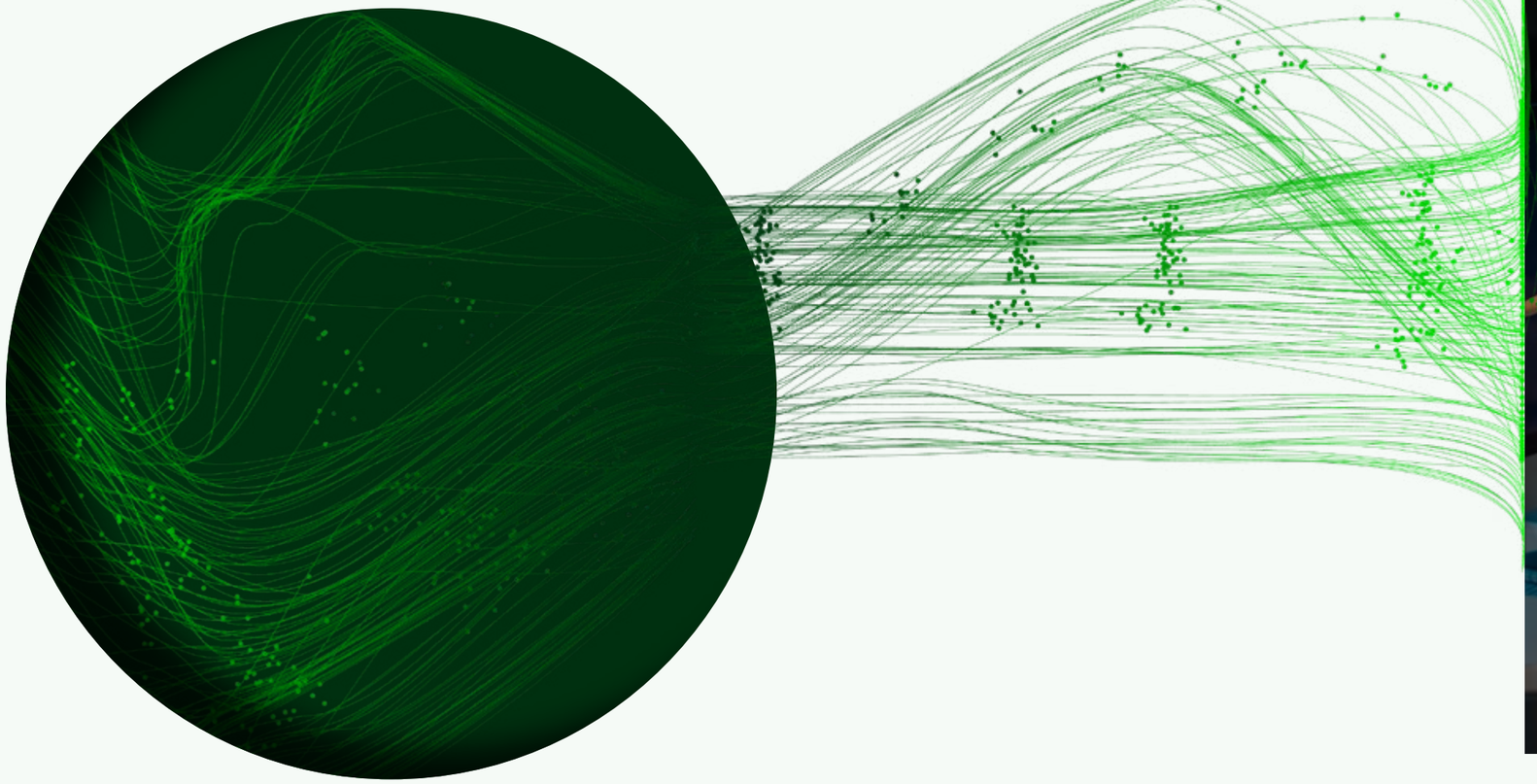
An important factor influencing technology adoption is whether employees have - or are able and willing to learn - the skills required to use new technologies. In accountancy, a global survey of CFOs and financial controllers finds that a key priority for finance employees in the future should be an understanding of advanced technologies.[1] However, there remains a lack of advanced technology skills among employees more generally.

**Cybersecurity, fear of data breaches, regulatory and compliance issues still prevent adoption of new technologies**

Data security and privacy concerns as well as regulatory and compliance issues still hinder the development and wider adoption of certain technologies that are reliant on having access to high volumes of data. Firms within the accounting and auditing as well as legal services sectors report that a lack of clarity of regulation regarding data sharing rules and limitations has hindered the development and adoption of certain technology solutions such as AI-based natural language processing tools. There are calls within the services sectors for a more robust regulatory environment regarding new technologies to help their commercialisation and remove unwanted barriers to trade and technology adoption.[2]

**Technologies, and potential applications, may still not have been proved to be commercially viable. It remains to be seen whether all potential use cases will have a place in their respective sectors**

Improvements in efficiency continue to be a key driver of the uptake of technnology innovations, and the more recent literature also puts emphasis on this. In insurance specifically, it is argued that AI will free up employee time, improve efficiencies and make it easier to collaborate across departments.[3] The automation of tasks such as legal research and document review is also expected to boost efficiency in the legal services industry.[4] The adoption of new technologies can also enable the creation of new products.[5] One example of this is in the insurance industry, where AI and the IoT allows the creation of highly individualised profiles of customer risk that can update in real time; insurers can focus on prevention rather than more traditional insurance products that focus on repairs.



AI for Services Report 2022

00 - Executive Summary



## The investment landscape

With the global AI market set to increase in size by a factor of ten between 2020 and 2028,[7] there is a strong incentive for investors and governments to invest in AI and related technologies. There is a strong funding environment in the UK for the Insurtech, Lawtech and Accountech sectors.

## Global context

We have identified four countries that showcase key strengths in terms of technology adoption and/or development in the accountancy, insurance or legal services sectors and make for an interesting case study or comparison with the UK:

- **The US** is the undisputed global leader in terms of ecosystem size and maturity across all three sectors of innovation in scope, i.e. Insurtech, Lawtech and Accountech. Key related strengths are the enormous size of the services sector and their corresponding markets, a very dynamic and risk-taking VC scene and access to a vast pool of world leading talent and skills.
- **Singapore** is a fertile ground for Lawtech innovation and adoption by the legal sector. The government has been strongly involved in driving up the Legal tech sector.
- **Germany**'s auditing sector has seen in-house technology development as a strategy to overcome the lack of external developers' appetite and pushes the technological capabilities of a somewhat traditional profession.
- **France** is the second largest insurance sector in Europe after the UK, and its Insurtech sector has been growing at a fast pace, concentrating 21% of total fintech investments in France and raising over €130 million (£117 million)[8] in 2020.[9]

## SWOT analysis of technology adoption in the UK services sectors and key recommendations

Against this background, a SWOT analysis of technology adoption in the services sectors was conducted. This analysis feeds into a set of recommendations and lessons for the UK services sector and wider government to overcome these challenges and exploit opportunities for further technology adoption:

1. Strengths: Europe's leading tech innovation capital and strong UK tech funding scene

   Recommendation 1.1: Maintain growth support across UK innovation hubs as a priority in public policy

   Recommendation 1.2: Encourage and support the regional diversification of funding by private investors

2. Weaknesses: Skills availability and development within the services sectors

   Recommendation 2.1: Encourage and support staff to develop tech-related skills

   Recommendation 2.2: Initiate upskilling at the early stages of professional development

   Recommendation 2.3: Hire employees with specialist technology skills

3. Opportunities: Lasting effects of the pandemic-induced momentum of technology adoption

   Recommendation 3.1: Set long term technology adoption strategies with dedicated resources and budgets within professional services firms

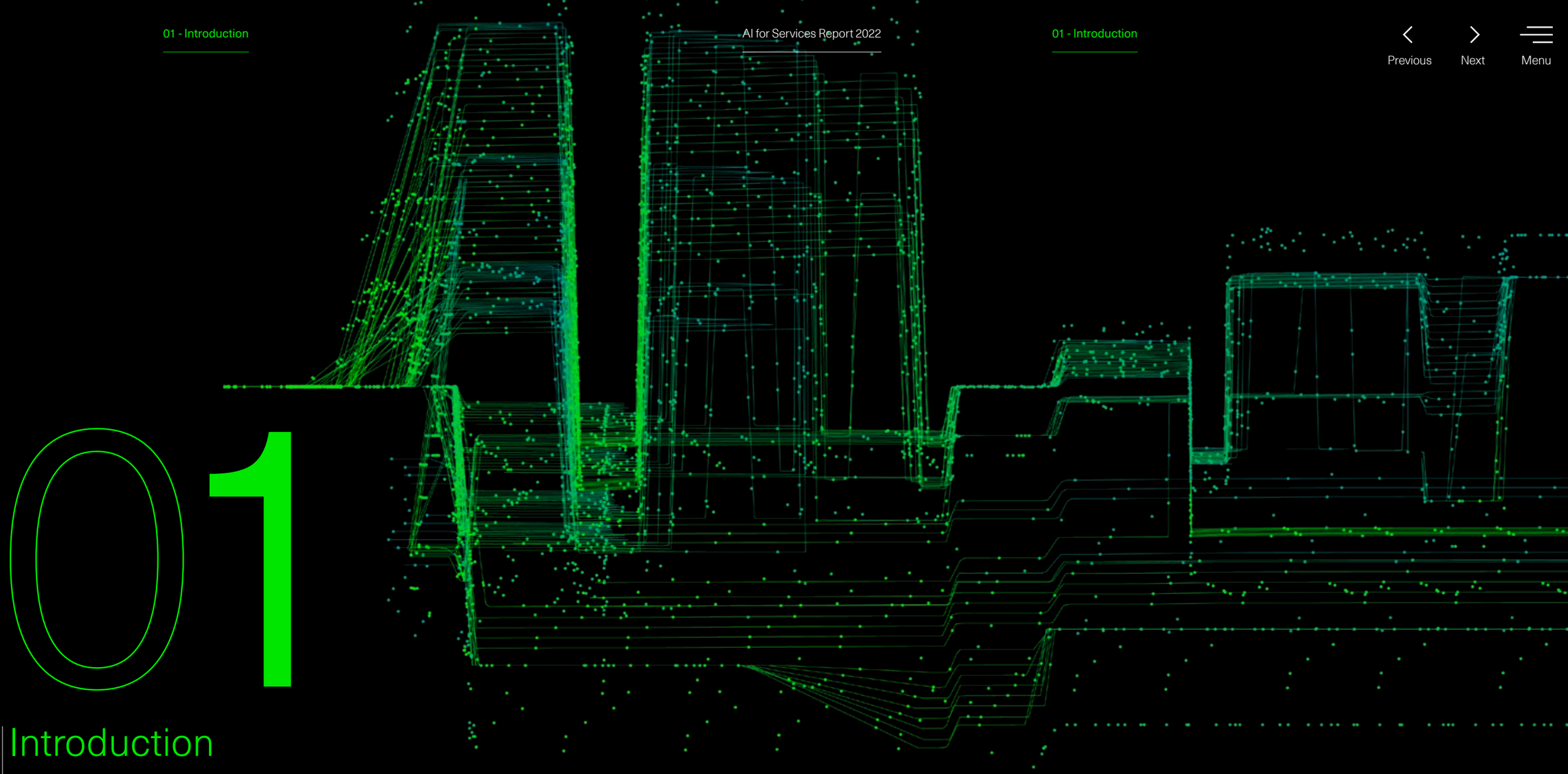
   Recommendation 3.2 Instigate more initiatives within the services sectors to develop relevant and valuable technology

4. Threats: Data limitations – from data security and privacy concerns to regulatory barriers

   Recommendation 4.1: Address gaps in existing data regulation and provide further clarity on how existing rules apply within each sector

   Recommendation 4.2: Develop regulation that promotes technological innovation and adoption in the services sectors

AI for Services Report 2022
01 - Introduction

# 01

# Introduction

In January 2022, the Innovate UK KTN engaged London Economics (LE) to produce an update on the key lessons learnt from the AI for Services report published in 2020.

In this second report, as the UKRI Next Generation Services Challenge programme is nearing its end and a new wider potential programme is in scope, we identify the latest innovation trends that influence and shape technology adoption and use in the UK accountancy, auditing, insurance and legal services sectors and their impact on business transformation. The report focuses on advanced and disruptive technologies including AI and advanced machine learning (ML), Internet-of-Things (IoT) and Big Data, advanced cloud computing technology, robots and robotic process automation (RPA) and blockchains. We also provide an investment landscape for early-stage accountancy, insurance and legal tech ventures in the UK. Lastly, we provide an overview of the UK positioning within the global context in terms of technological capability, capacity and adoption and identify areas of strength and weaknesses with actionable steps that actors in the sector can take to ensure the services sector reaps the maximum benefit from technological advances.

Close to two years since the start of the Covid-19 crisis, evidence confirms that the pandemic has indeed spurred the pace of technological adoption across a wide range of sectors and industries worldwide, with businesses of all sizes undergoing long term transformational changes.[10] In addition to the pandemic driving businesses to adopt remote and digital ways of working, there has been a steady increase in appetite for the wider adoption of disruptive and innovative technology, including within the insurance, legal services and accountancy sectors. For instance, applied AI technology, 5G and IoT connectivity, cloud and edge computing, robots and RPA, next-generation computing technology, as well as zero-trust security and blockchains are among the top technology trends disrupting businesses in the insurance sector.[11]

Insurers are expected to increasingly make use of AI pattern recognition, future behaviour predictions and intelligent automation as well as IoT and Big Data technologies to significantly streamline processes such as pricing, underwriting, claims handling, policy holder interactions and fraud management.[12] The Insurtech sector is becoming a key player within the UK's fintech industry, with investments totalling £262 million in 2020, increasing by more than 60% since 2019.[13] In the accounting sector, the adoption of advanced technology was well underway pre-pandemic led by the Big Four accounting firms[14] which had invested billions of dollars on artificial intelligence and data analytics products by January 2020.[15] The Association of International Certified Professional Accountants has even implemented its own start up accelerator program to support companies in Accountech and Regtech, i.e. companies developing advanced technologies aimed at improving efficiencies in accounting and the delivery of regulatory requirements respectively.[16] A recent survey of 3,000 CPAs and finance and accounting professionals identifies Big Data and the use of high-speed analytics, AI and advanced ML and cognitive applications, advanced cloud services and RPA as the technology trends with the greatest impact on the profession over the next three years.[17]

In the legal sector, LawtechUK estimates that increased use of Lawtech products and services such as AI review tools, document automation, online dispute resolution, digital documents as well as structured collection and use of data can lead to productivity gains by legal service providers, worth up to £1.7bn annually.[18] Increased appetite for disruptive technologies within the UK legal sector is reflected in the fast-track trajectory of growth of the UK Lawtech sector over the last three years, which has been growing at an average rate of 101% a year, outpacing other applied tech sectors, and is expected to attract up to £2.2bn in investment per year by 2026.[19]

Given the strong UK government support identified in our AI for Services 2020 report, the UK services sectors are well placed to maintain the momentum post pandemic and take full advantage of technological innovations and advances. However, the global landscape is increasingly competitive, with leading and emerging ecosystems worldwide also making considerable investments in advanced technologies. As the world transitions to a post-pandemic era, the report commissioned by Innovate UK KTN will be a valuable tool for policymakers, investors and businesses to gauge the current and expected opportunities and challenges facing sustainable technological innovation and adoption.

# Key themes influencing and shaping technology adoption in the **accountancy, insurance** and **legal services sectors**



AI for Services Report 2022
01 - Introduction



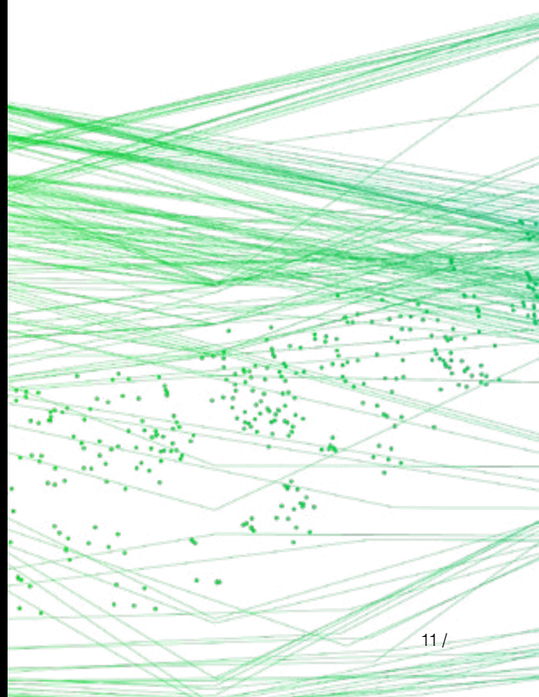
## 01.1 The investment landscape

This study aims to provide an understanding of the **key themes influencing and shaping technology adoption in the accountancy, insurance and legal services sectors.** Particularly, this report focuses on how the findings in the first report have changed or developed since the publication of the initial AI for Services report. This research also adds to the understanding of technology in these sectors by providing an overview of the **investment and funding landscape** - namely the prevalence and accessibility of funding for advanced technologies and new solutions. Finally, this report compares the UK service sectors with four other global services sectors, to provide an international benchmark.

The following strands of research in this study includes:

- **A review of existing literature and studies** related to technology adoption in the service sectors published since the release of the first AI for Services report.
- Primary data collection in the form of an **online survey** of AI for Services Members and other relevant organisations - targeting senior decision makers within these organisations. This survey was supplemented with **additional in-depth interviews** to provide additional nuance and detail on key themes discussed in the literature.
- **Funding and investment data** from Crunchbase to provide an indicative view on the prevalence of technology-focused start-ups as well as provided levels of funding.

Based on the information collected, a SWOT analysis of technology adoption in these service sectors was conducted - this analysis then fed into a set of recommendations and lessons for the sector and wider government to exploit opportunities for further adoption to be formed.



# 02 Innovation: what has influenced and shaped technology in the service sectors?

**The findings from the first report**

The AI for Services 2020 report provided an overview of technology adoption in the accountancy, legal and insurance sectors. The key recommendations which resulted were as follows:

1. **Continue to tackle the funding and skills challenges**

   Adoption in the UK service sectors were hampered by availability of funding, and data and technical related skills. A lack of data scientists and technical progress combined with a low understanding and appreciation of digital technologies had led to slow adoption.

2. **Make data fit for innovation**

   The creation of data standards and common interfaces would improve the accessibility of data for technology solutions.

3. **Foster a culture of innovation**

   Firms within the service sectors should cultivate organisational structures which are conductive for adoption of new technologies.

4. **Create meaningful partnerships**

   Incumbents should be transparent about the challenges they face and be open to solutions from outside their organisation; and innovators should be clear about the value their solutions brings for these incumbents.

5. **Create regulation that is conducive to innovation**

   Government and regulators should work with industry to ensure that inadequate - or a lack of - regulation does not hinder innovation.

This report found that there were opportunities for these service sectors to adopt new and advanced technologies, but key barriers prevented wide-scale adoption. This section presents the key drivers and themes which are currently influencing adoption and whether the barriers identified in the first report are still evident.



AI for Services Report 2022
02 - Innovation



## 02.1 COVID-19 spurred changes in working patterns - the effects of this continue to be felt within the service sectors

The Covid-19 pandemic has changed the business landscape in many sectors since 2020, having a particular impact on the increased adoption of innovation and technology.

Businesses were forced to change their practices at the start of the pandemic, with lockdown restrictions requiring the implementation of a work from home strategy. Working from home orders meant that collaboration between colleagues moved online, and face-to-face customer interaction disappeared. These changes meant that companies had to adopt technologies that they had not used before, or that technologies they had previously used sparingly (such as video-conferencing tools) became essential to their business practices. During the pandemic, companies accelerated the digitalisation of their operations (ahead by 3-4 years)and the introduction of digital products in their portfolios (ahead by 7 years).[20] For the accountancy industry, some argue that the pandemic has caused the digital transformation to accelerate by decades rather than years.[21] Before the pandemic, the trend of technological adoption and digitalisation facing these firms suggests that these changes would have occurred regardless – however, adoption would have been more gradual without the urgency caused by the pandemic. Similar to the findings in the first report,[22] this suggests that the pandemic has accelerated change and generated momentum towards the adoption of new technologies and innovations. Results from the survey administered as part of this study show that across the accounting, insurance and legal services sector, respondents find that the pandemic has spurred a behavioural change from end users toward an increased adoption and use of technology as part of existing workflows.[23] These enforced changes to existing workflows such as the move towards remote working, seem to have been mostly successful.[24] The increased adoption of technologies was essential to ensure that the move to remote working could be implemented, and the success of this suggests that technology can play a greater role in business practices than previously thought.[25] Whilst the pandemic forced businesses to move towards an increasingly digital model in the short-term, this seems to have improved company operations - so many changes are expected to stay.

Furthermore, the successful adoption of technology during the pandemic is thought to have encouraged businesses to further increase their adoption of technology more broadly – for example the pandemic has changed the status quo in regard to technology adoption in a relatively conservative legal sector and has prepared the sector for genuine digital transformation.[26] A survey of 900 legal firms completed by the University of Oxford for the Solicitor's Regulation Authority[27] revealed that there has been a steep change in the adoption of legal technology and innovation as a result of COVID-19.

The pandemic has also led to an increase in the prevalence of virtual hearings in countries like Singapore.[28] Meanwhile, the shift to virtual hearings during the pandemic was more limited in the UK, where pandemic has further exacerbated the backlog of court cases waiting to be tried in the criminal courts system.[29] Similarly, Covid-19 has put an emphasis on digital technologies overall and brought about a greater willingness to embrace change. This is set to increase the adoption of AI in the insurance industry,[30] despite companies not having invested heavily in AI during the pandemic, focusing instead on the deployment of technologies such as collaborative dashboards and communication tools which were urgently needed as a consequence of remote working.

Further change is expected through to the end of this decade. The accountancy industry is thought to be 'on the cusp of arguably its greatest transformation'.[31] Similarly, in a recent survey, 88% of solicitors in England and Wales agree that the legal landscape is changing faster than ever.[32] Law firms consulted as part of this study confirm that the pandemic has not only accelerated the rate of technology adoption but has had lasting impact on appetite for technology adoption within a relatively conservative legal industry. Lawyers who, prior to the pandemic, may have been less familiar with the benefits that technology adoption can bring are keen to continue adopting new and more advanced technologies beyond those introduced during the pandemic.[33] The number of in-house projects related to technology development within one of the law firms that was consulted as part of this study increased significantly during the pandemic.[34]

Advancements in computer power and the advent of new techniques have made new technologies such as natural language processing (NLP) and machine learning more technologically and financially viable in the accountancy and auditing sectors. [35] In the insurance industry, it is argued that change will accelerate for different reasons, such as the industry becoming more adept at using advanced technologies.[36] As workforces becomes increasingly technologically literate, the costs of adopting new technologies that arise from the training of staff decreases. It becomes easier for firms to adopt new technologies, which encourages change to accelerate. Most respondents in a survey of SME law firms in England and Wales reported that not keeping up with the latest technology trends is a significant threat to their business [37] - this fear of falling behind incentivises these firms to adopt new technologies and innovations.

# 02.2 Skills availability and leadership commitment remain key challenges in advanced technology adoption by the services sector

### Availability and development of skills remain key challenges in deepening technology adoption

An important factor influencing technology adoption is whether employees have - or are able and willing to learn - the skills required to use new technologies. In accountancy, a global survey of CFOs and financial controllers finds that a key priority for finance employees in the future should be an understanding of advanced technologies.[38] The report also encourages the hiring of employees with specialist skills such as AI knowledge alongside the upskilling of current employees in the area. Other sources focusing on the legal sector suggest that employing people with skills in new technologies will be vital for the legal sector to compete in the future.[39]

However, there remains a lack of advanced technology skills among employees more generally, which was discussed at length in the first report.[40] The persisting shortage of skills is identified in sources looking at the economy overall as well as those focusing on the insurance and law sectors.[41] Most respondents to the survey administered as part of this study and who are operating in the services sector agree that a lack of access to staff with right skills is a key challenge to the adoption of advanced and disruptive technology within the services sector.[42]

The importance of these skills depends on the change expected in the business model of the sector. Traditional accountants are expected to have new tasks created by future innovations, such as helping clients adapt to new technologies or identifying gaps in technology infrastructure.[43] Whilst it is expected that more lawyers will spend time producing Lawtech solutions - rather than taking part in more traditional law work - these tasks are expected to be undertaken by separate companies rather than encompassed as part of a traditional lawyer's work.[44] Currently, law firms typically buy software solutions from external vendors instead of developing solutions in-house.[45] One interviewee from the legal sector commented that their incumbent firm viewed investment into technical skills and software purely as a cost, rather than as a pathway for higher future profits. For example, there is a hesitancy to hire additional data scientists as these employees are not fee-earners and are perceived as unable to maximise firm profits to the same extent as other (fee-earning) employees. In the same vein, while newer generations of lawyers are significantly more digitally proficient and open to using new technologies, they often face a tradeoff between investing training time to learn how to use new technologies and the ongoingly heavy workload and tight deadlines and find they have to prioritise the latter.[46]

### Some improvements have been made and further change is expected

Despite these challenges, there have been improvements in terms of technology adoption and availability of skills. Some respondents to the survey administered as part of this study and who are operating in the services sector report an increase in the number of data scientists/ professionals employed in their company.[47] From the (previously mentioned) survey of 900 legal firms completed by the University of Oxford for the Solicitor's Regulation Authority[48] found that over a third of firms (35%) had introduced new technology in the last 12 months, while over half (55%) had improved or increased use of existing technology.[49] Adoption of tech by these law firms can also be seen at events such as the Legal Innovation Awards, where firms such as Pinsent Masons, MacFarlanes & Slaughter & May were nominated for their activities in legal technology.
The big law firms are investing more heavily in innovation teams whose focus is to identify lawyers' and clients' needs and requests for technological solutions then source and/or develop these solutions.[50] Firm leadership are increasingly willing to fund the initiatives and technology solutions brought forward by these teams.[51] Survey respondents report that the number of data scientists employed by their firm has somewhat increased. Lawyers who are familiar with or trained in Lawtech are also more prevalent, especially among the younger generations of lawyers. In the US, the American Bar Association amended its professional conduct rules to include an ethical duty of technology competence.[52] In Singapore, the country's most prestigious university (Singapore Management University) has established the Centre for Computational Law within its Law Department, which offers courses and conducts research in the intersection between law and technology, training more lawyers to also be proficient in law tech.[53]

The insurance industry also expects substantial change and employees in these insurance firms are likely to see their job roles change as well. Employing workers able to use new technologies is likely to become increasingly important, and there is likely to be an increased emphasis on upskilling current staff.



AI for Services Report 2022
02 - Innovation



### Resistance to change and lack of understanding of the technology among decision-makers

Potential challenges that hamper the adoption of new technologies and skills development include a lack of expertise surrounding new technologies[54] and a resistance to change among decision-makers, in particular in the legal[55] and accounting[56] sectors. Some sources have also reported an unwillingness from employees to adopt AI as well as a lack of expertise, although this has decreased in recent years.[57] The unwillingness of customers may also be problematic, with only 15% of customers reporting that they would prefer to use a chatbot rather than speak to an employee.[58]

Part of the reasoning behind the resistance to innovation seen from decision-makers and employees may be the suitability of current technologies to their work. Looking at insurance, it is important that new solutions can be integrated into the current core systems used by the firm.[59] If this is not the case then the adoption of new technologies requires further adjustments and becomes less attractive to the company. A survey of business who have adopted new technologies found that 17% of respondents from small and medium enterprises found difficulties in integration to be a key barrier to technology adoption.[60] Other barriers to adoption found in the survey that relate to the suitability of new technologies include the complexity of the solution (14%) and the extent of customisation that is required (18%).

In the legal sector, there is a gap between the maturity of the technology available and that of lawyers' mindsets and current processes used in law firms. While the technology is ready, the legal sector is not necessarily ready to integrate some of these technologies to their existing workflows.
The technology often streamlines existing workflows in the legal profession that are lengthy and cumbersome. However, the simplification of the process can be misinterpreted by the legal profession as skipping important steps and compromising on the due diligence of the process.[61] The resistance to adopting new technologies also comes from the older generation of lawyer's experience from when they were training as junior lawyers. Now, as senior partners in executive positions within law firms, they are more resistant to integrating new technologies. For example, they may view the manual efforts of reading through high volumes of lengthy legal documents as essential training and necessary to become an accomplished lawyer. As a result, they are less willing to support and commit to the widespread use of technologies such as natural language processing and proofreading tools among their staff. Survey respondents report that there remain challenges in the form of resistance or at the very least limited ownership and commitment from the executive in the legal sector to the adoption of new technologies.

Lastly, the adoption of one technology by professional services firms is likely to be influenced by the adoption and development of other new technologies.
The interconnected nature of IoT, digital twins and advanced cloud computing was discussed previously in the context of the insurance sector. Developments in cloud computing are critical for the evolution of the computing power required to deal with incredibly large datasets.[62] If cloud computing does not advance as fast as expected, then IoT will become less effective for insurers as the use of large datasets will be less efficient or substantially limited. If this hampers the use of IoT in the insurance sector, then this will have a knock-on effect for the use of digital twins as well, which is more effective with more data points (such as those that come from the IoT).

Over a third of firms (**35%**) had **introduced new technology** in the last 12 months, while over half (**55%**) had improved or increased use of **existing technology**.

# 02.3 Cybersecurity, fear of data breaches, regulatory and compliance issues still prevent adoption of new technologies

There are also numerous issues surrounding the use and governance of data. Firstly, some argue that AI is moving too fast for regulation to keep up. A survey of business leaders found this opinion to be of particular relevance to small companies (63%) and business leaders who declare they have high AI knowledge (51%).[63] There are calls for a more robust regulatory environment regarding new technologies to help their commercialisation and remove unwanted barriers to trade and technology adoption.[64] A survey of UK law firms found unexpected legal and regulatory issues to be the second most important risk associated with legal technology.[65] Of those that reported this as an issue, most (70%) thought legal technology could bring risks surrounding client confidentiality and data protection. There is a possibility that law firms may be less willing to adopt new technologies if there are concerns around the security of the data being used. This is also an issue more generally, with some organisations reporting being less willing to make full use of new technologies due to the risk of non-compliance or doing harm.[66]

Clarity and certainty surrounding data sharing, AI and new technology regulations could encourage the uptake of new innovations that would bring benefits to all. Increased regulation is not necessarily perceived as a barrier but rather as an enabler if it provides more clarity on how to develop and use these new technologies. For example, clear regulation can alleviate issues of trust around data sharing between legal industry players and increase the amount of data that is available to all for the development of precise AI tools and other data-based technologies.[67] The results from the survey administered as part of this study show that, across the three services sectors in scope, most respondents agree that regulatory compliance and barriers as well as concerns surrounding personal privacy and data protection still represent key challenges to the adoption of advance technology in their respective sector.[68]

Cybersecurity is another concern surrounding the use of data. A worldwide, cross-industry survey of companies that use AI found cybersecurity to be the most important risk of AI in both 2020 and 2021, although the risk had decreased in 2021.[69] Issues surrounding cybersecurity were also reported in the survey in the first AI for Services report. Although evidence in the insurance sector finds that customers are becoming increasingly comfortable with insurers using their data to improve their experience, it is noted that this could be impacted if data is not protected sufficiently.[70] Ensuring data is secure and the threat of cyber-attacks is minimised will help ensure trust in new technologies for both companies and customers.

Nevertheless, there are some positive shifts in the regulatory stance toward the deployment of data dependent technologies in these sectors. For example, In Singapore, rather than acting as barriers, the government and regulatory authority are facilitating the development of technologies for the legal sector.[71] The government invested S$2.8 million (£1.6 million)[72] in the 2017 Tech Start for Law programme where 115 law practices were funded for up to 70% of their first-year implementation cost of new technologies. This support was extended further in the 2019 Tech-celerate for Law program, a joint initiative between the public, regulatory and private sectors allowing Singapore Law Practices to get up to 80% of grant support for Lawtech implementations.[73]

In the EU, EIOPA, the European Insurance and Occupational Authority, is planning on introducing an overarching regulation for open insurance, focused on access to and sharing of insurance-related data.[74] The new regulation is likely to benefit the development of data-based technology solutions and AI tools in Insurtech. Similarly, in the audit and accounting sector, regulatory changes have facilitated the use of tools and solutions that rely on data sharing and processing. For example, BaFin, the German Financial Supervisory Authority has changed the law to allow auditors to make use of cloud computing and adopt solutions that use high volumes of data.[75]

In the UK, there is potential for regulators to seize on post-Brexit leeway and overhaul existing regulation and red tape to create a more dynamic regime in each of the services sector. For example, in the insurance sector, the UK plans to scrap the EU Solvency II rules and replace them with a more agile and easily adaptable regime. The new regime plans to alleviate some of the capital requirements and administrative burden currently facing the UK insurance sector, free up capital for increased investments by incumbent firms into technology development and adoption as well as support the entry of new and innovative firms in the insurance sector.[76]



AI for Services Report 2022
02 - Innovation



Clarity and certainty surrounding AI and new technology regulations could encourage the uptake of new innovations that would bring benefits to all.

# 02.4 Technologies, and potential applications, may still not have been proved to be commercially viable. It remains to be seen whether all potential use cases will have a place in their respective sectors

Improvements in efficiency were discussed extensively in the first report[77] as a key driver of the uptake of new innovations, and the more recent literature also puts emphasis on this. Looking generally across sectors, numerous sources
suggest that efficiency and productivity gains - or positive impacts on profits - are key opportunities that arise from the adoption of new technologies.[78]
In insurance specifically, it is argued that AI will free up employee time, improve efficiencies and make it easier to collaborate across departments.[79]
As repetitive tasks become automated, employees have more time to complete other tasks such as client interaction. More tasks will be completed by the same number of employees so gains in productivity will be realised. The automation of tasks such as legal research and document review is also expected to boost efficiency in the legal services industry.[80] Results from the survey administered as part of this study show that respondents in the services sector use technology mainly to complement human activities (e.g. decision support, better insights).[81] Some respondents also use technology to make existing tasks more efficient or automate routine tasks but to a lesser extent.

Another common theme is that the adoption of new technologies could enable the creation of new products.[82] One example of this is in the insurance industry, where AI and the IoT allows the creation of highly individualised profiles of customer risk that can update in real time;[83] insurers can focus on the prevention-focussed approach rather than more traditional insurance products that focus on repairs. As per the example discussed earlier, insurers may move away from the traditional contents insurance model and instead begin selling maintenance packages, which focus on minor fixes to items that currently work but are predicted to break in the near future. Separately, sources focussing on insurance also suggests that the adoption of new technologies can create a better customer experience.[84]
This follows on from the first report,[85] which found that customers are expecting better customer service, partly as a result of new technologies that have improved experiences in other industries.

Despite the literature identifying several potential innovations in the accountancy industry, uptake is limited. Key technologies related to the accountancy industry include big data analytics, advanced cloud computing and AI. Big data analytics is found to be the most important technology trend in the accountancy and finance world, especially deployed as a complement to existing information management systems.[86] Advanced cloud computing, which may involve improvements which increase the speed or security of the cloud, or may be tailored to a certain use (such as being optimised for the internet of things), could represent a major shift in how organisations use and maintain their software. Similar to the findings in the first report,[87] AI is discussed by numerous sources, with applications including the extraction of insights from clients' financial information[88] and fraud detection.[89] AI can currently be used in cashflow forecasting, using historic spending patterns and likely future payments to forecast a company's future cash flow – although the usefulness of this is currently limited as the technology is unable to predict month-on-month changes. Although technologies such as AI are being used increasingly, those that use them are in the minority, with only 19% of UK respondents in a worldwide survey of accountants reporting that their organisation uses AI for accountancy and finance related tasks.[90] This is not unique to the UK however, as the proportion of respondents worldwide that respond in this way is also 19%.

A wide range of technologies and innovations are specified in the literature focused on the insurance sector, which are set to impact processes from underwriting to policy holder interactions.[91] Similarly to the accountancy sector, AI and NLP are likely to play a role in extracting knowledge from documents,[92] and cloud implementation is set to increase helping insurers make better use of large datasets.[93] This will be of importance to another innovation that is mentioned in the sources: the internet of things (IoT). This is where everyday items, such as fridges and thermostats, are designed to be able to connect to the internet and exchange data with other devices and systems. As more existing devices become part of the IoT, alongside new devices that will become a part of everyday life, insurers will receive a greater number of data points; allowing insurers to better understand the risk of a potential claim and tailor quotes accordingly. For example, the predictive intelligence company Windward uses the IoT for maritime assets to assess risks based on near-real-time conditions.[94] However, as the number of data points increases, data storage technologies also need to improve and this is where advancements in cloud computing will be required.

Digital twins could also become a central part of an insurers' determination of risk, which is where simulations are conducted using computerised representations of objects (including people, houses and cars) in order to assess the impacts of potential risks.[95] Previously, insurers have only been able to use historic data for risk assessments, but digital twins will mean they can assess the impacts of potential future disasters. Digital twins become more powerful if they can collect more real time data, and the availability of data will only increase with the development of the IoT. The examples shown here surrounding digital twins, cloud computing and the IoT show that the development of new technologies is interconnected.





Digital twins will be more powerful if the IoT grows, and the utilisation of IoT data will be improved with advancements in cloud computing.

In contrast to the legal sector, the insurance industry is expected to see substantial changes, which will be caused partly by the adoption of advanced technologies more broadly and across industries. Looking at the automotive sector for example, self-driving cars will shift risks from the driver to the software itself.[96] The products that insurers offer, and their determination of risk, will have to change as a result of this (and other new technologies). Secondly, the increase in data points associated with the IoT will shift insurance to a 'predict and prevent' model, rather than one that focusses on the consequences of accidents.[97] For example, insurers will be able to use data they receive from homes to predict when household appliances are likely to break or to find minor faults before they turn into larger issues; this will again lead to changes in the products offered by insurers. Whilst this will be driven by advancements in technology in other industries, the insurance industry will have to innovate to ensure it is able to benefit from these broader technological developments.

The literature on the legal sector suggests that the industry lags behind the insurance sector in terms of the adoption of new technologies and innovations. A UK survey of almost 900 law firms found that the most prevalent types of legal technology currently used are videoconferencing, cloud computing, practice management software and legal research software.[98] Those technologies that law firms are most likely to be planning to use in the future include electronic signatures, online portals and interactive websites for legal document generation. Similarly to the accountancy sector, those that use AI are in the minority, with only 23% of respondents (to a survey of people at law firms and in-house counsel offices) reporting that they use AI or machine learning.[99] Furthermore, 24% of respondents were not sure, which indicates a possible knowledge gap in the sector regarding these technologies (for example, respondents may be using AI during their work but are unaware of it).

The expected impact of new technologies on business models varies across the industries discussed in this report. In the legal sector, solutions are more likely to be outsourced to Lawtech firms than to be developed in-house.[100] The Lawtech business model based on product sales has grown in recent years and is likely to grow in the future, and there is likely to be an increasing number of lawyers that work on Lawtech solutions. However, this is separate to the business model of the traditional law firm. In the case of the traditional law firm, some tasks will be completed by outsourced technology rather than workers, but the business model in terms of the services provided by the firm may not change substantially as a result of new technologies.[101] However, there may be changes surrounding the clients that lawyers work for, as deep technology companies become more prevalent and larger across other industries. Technology-focussed lawyers will be crucial for the growth of deep technology companies more generally.[102] This suggests that the knowledge lawyers have surrounding new technologies will influence the growth of businesses creating deep technology innovations, regardless of the extent to which the business model of the traditional law firm changes.
A law firm that was consulted as part of this study indicated that, efforts - to keep pace with increased technology adoption by clients from across different sectors and to meet those clients' expectations or requests to be offered legal services with a similar level of technological sophistication as their own - are one of the drivers of their own increase in technology adoption. [103]

One interviewee involved with legal regulation emphasised that case studies, and trials uses and applications of this technology, are vital for driving adoption and managerial buy-in. Organisations and decision-makers are often unaware exactly how technology can benefit their business processes. The use of examples, case studies and trials could both prove viability, and drive demand for these new technologies.

Another interviewee confirmed this by stating that huge swathes of the legal sector do not understand how technology can help them, and that it is difficult to communicate this to incumbent law firms. As discussed in the first report, law firms are incentivised by their partner model to maximise annual profits, and investments (such as those into new technology) which may take multiple years to produce a return are not particularly attractive.

Nevertheless, a law firm that was consulted as part of this study noted that the wide applicability of English law across global commercial relationships and transactions, combined with strong government support of the UK Lawtech sector, provide the latter with greater opportunities for global exports and scale-up. [104]

AI for Services Report 2022
03 - The investment landscape


# 03

# The investment landscape

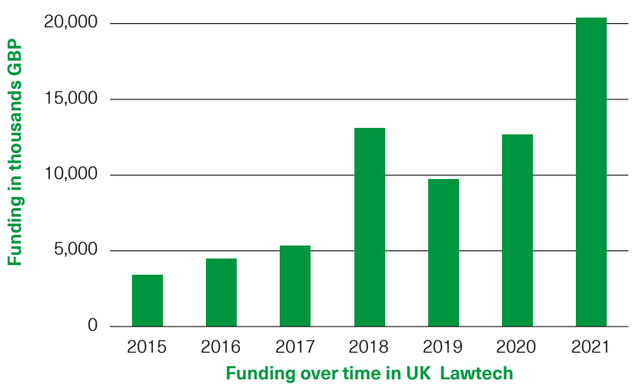
With the global AI market set to increase in size by a factor of ten between 2020 and 2028,[105] there is a strong incentive for investors and governments to invest in AI and related technologies. It is suggested that underinvestment from governments could weaken a country's economic and military competitiveness. As discussed in the first report,[106] there is a strong funding environment in the UK for new technologies. The UK is ranked 10th for AI investment and talent, performing similarly to countries such as Germany and France.[107] Furthermore, the negative impacts of the Covid-19 crisis seem to have begun to dissipate. Looking overall, a reduction in the impact of Covid-19 on investment was already beginning after the first lockdown, during Q3 of 2020.[108]

Looking across all sectors, there has been an increased interest in new technologies in recent years, with deep technology now making up 22% of all UK VC deals.[109] Deep technology includes a wide range of innovations as long as they are new and ground-breaking technologies (including areas relevant to the accounting, insurance and legal sectors such as AI). Reasons for this include advancements in technologies that have increase commercial applications and societal changes increasing the appetite to address global challenges. This suggests that there may be increasing opportunities for firms in the accountancy, legal and insurance sectors that are developing new and innovative technologies to attract investment.

The UK has a leading Lawtech market with just under 200 startups.[110] 2021 has been a positive year for Lawtech investment in the UK which reached its highest level on record.[111] This was driven wholly by venture capitalists. Funding from angel investors, friends, family and old work colleagues is extremely important for Lawtechs, but outside of this Lawtechs often target specialist investors known as early stage Lawtech investors as well. Most investment activity in Lawtechs is in the early stages in the UK; seed investment is three times as common as the next most prevalent funding type (which is series A funding). Consolidation is common in the sector, although acquisitions are by a wide variety of firms rather than a small number of big players.

Funding amount in the UK lawtech scene has experienced steady growth in the last 6 to 7 years with a slight slump in 2019 (see Figure 1). Nevertheless, yearly funding has increased close to five-fold between 2015 and 2021, reaching close to $27 million (£20 million)[112] in 2021. Funding growth is likely to accelerate in the next years: just in the first quarter of 2022, the sector has already amassed close to $21 million (£16 million)[113] of funding.[114] There is still a lot of untapped potential in the sector that is likely to drive up investor interest. UK Lawtech startups and scaleups are now growing at a rate of 101%, outpacing fintech, climate tech and healthtech.[115]

**Figure 1 Funding amount received by the UK Lawtech sector: 2015 - 2021**

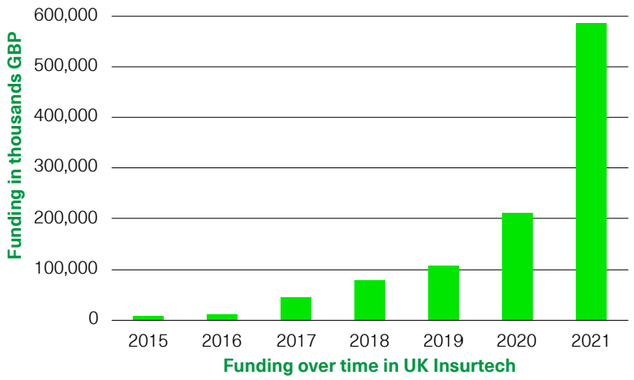



Source: LE analysis of Crunchbase data [Data accessed on 21/03/2022]

The UK also has a leading Insurtech market, with more Insurtech transactions than any country except the US.[116] Similar to startups in the legal sector, Insurtechs have also enjoyed record-breaking levels of funding in 2021, with both the number of deals and the level of investment reaching their highest levels globally in 2021 compared to any other year. However, it is noted that this is concentrated among a small number of companies, with 95% of Insurtechs receiving no funding in Q2 2021. There has been particular growth within early-stage funding, which reached its highest level on record in Q2 2021 and then saw an increase of 20% on top of that in Q3 2021. The number of investors investing in Insurtech has also increased, doubling between 2017 and 2021.

Funding amount in the UK Insurtech sector has experienced steep growth in the last 6 to 7 years. The sharpest increase was in 2021: yearly funding amount increased by 176% to over $770 million (£582 million)[117,118] (see Figure 1). Moreover, four UK Insurtech companies – Bought By Many, Zego, Tractable and Marshmallow - established Unicorn status in 2021. This compares to only 4 other European Insurtech companies (2 in Germany and 2 in France) achieving Unicorn status, also in 2021.[119]

**Figure 2 Funding amount received by the UK Insurtech sector: 2015 - 2021**



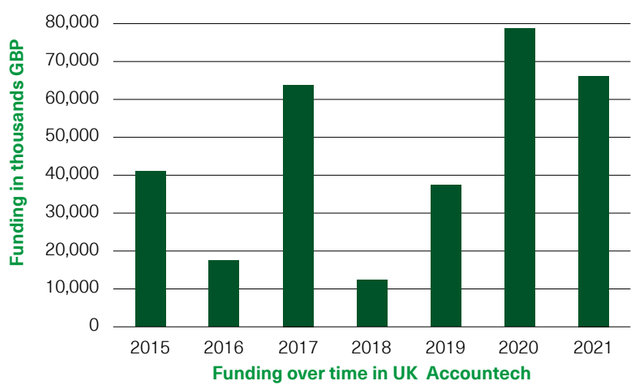

Source: LE analysis of Crunchbase data [Data accessed on 21/03/2022]

Compared to Insurtech and Lawtech funding, UK Accountech funding has experienced less of a smooth and consistent growth in the last 6 to 7 years, with its most recent slump recorded in 2021. Nevertheless overall sector funding has increased by 60% between 2015 and 2021.





**Figure 3 Funding amount received by the UK Accountech sector: 2015 – 2021**

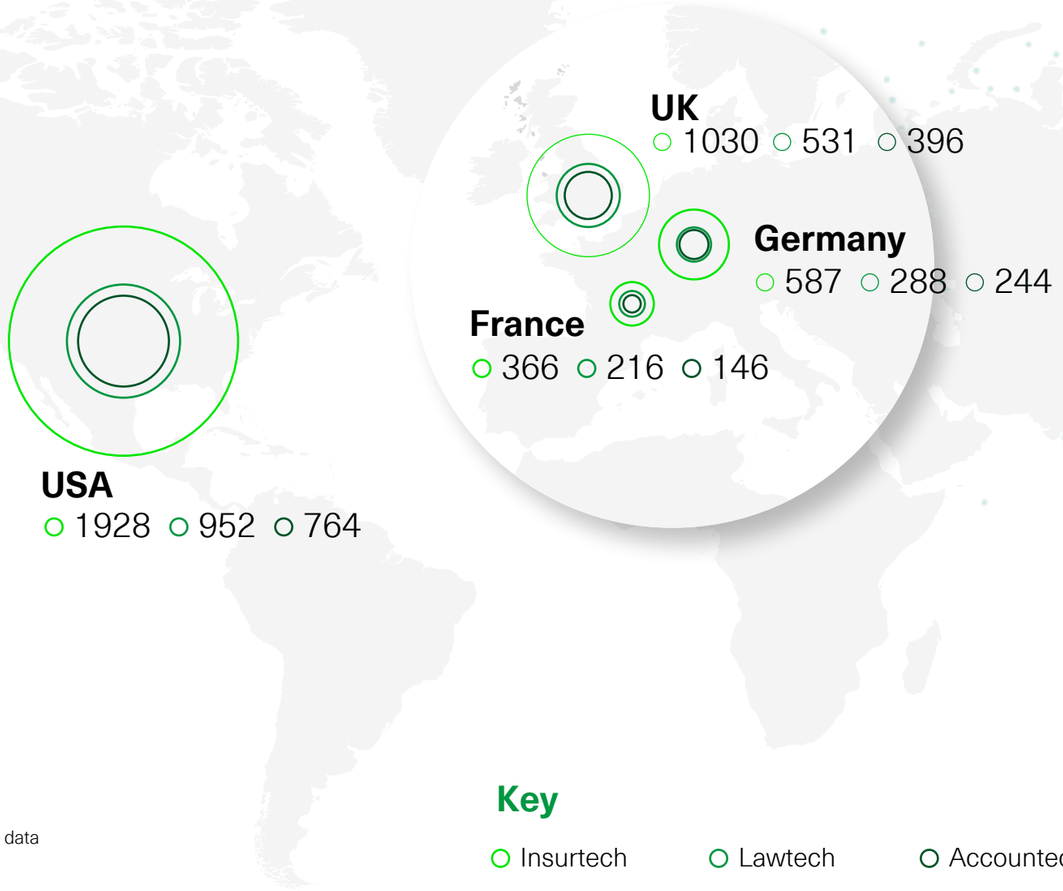



Source: LE analysis of Crunchbase data [Data accessed on 21/03/2022]

In terms of investor landscape, the UK ranks relatively well in terms of number of active investors in its Insurtech, Lawtech and Accountech sectors. The UK attracts over a thousand investors in Insurtech, which is close to 1.8 times the number of active investors in the second largest European Insurtech hub – Germany (see Figure 1). The gap with its next largest European counterparts is similarly pronounced in Lawtech and to a lesser extent in Accountech, with the UK respectively attracting well over 500 investors and close to 400 investors (see Figure 2 and Figure 3).

AI for Services Report 2022
03 - The investment landscape


**Figure 4: Number of active global investors in Insurtech, Lawtech and Accountech per country**




Source: LE analysis of Crunchbase data
[Data accessed on 10/02/2022]

# 04 Global context

We have identified four countries that showcase key strengths in terms of technology adoption and/or development in the accountancy, insurance or legal services sectors and make for an interesting case study or comparison with the UK:

- **The US is the undisputed global leader in terms of ecosystem size and maturity across all three sectors of innovation in scope, i.e. Insurtech, Lawtech and Accountech. Key related strengths are the enormous size of the services sector and their corresponding markets , a hyper dynamic and risk-taking VC scene and access to a vast pool of world leading talent and skills.**
- **Singapore is a fertile ground for Lawtech innovation and adoption by the legal sector. The government has been strongly involved in driving up the Legal tech sector.**
- **Germany's auditing sector in-house technology development which has looked to overcome the lack of external developers' appetite and pushes the technological capabilities of a somewhat traditional profession makes for an interesting case study.**
- **France is the second largest Insurance sector in Europe after the UK, and its Insurtech sector has been growing at a fast pace, concentrating 21% of total fintech investments in France and raising over €130 million (£117 million) [120] in 2020. [121]**





## 04.1 United States

### Leader in size and maturity of its tech ecosystems

The US is the undisputed global leader in terms of ecosystem size and maturity across all three sectors of innovation in scope, i.e. Insurtech, Lawtech and Accountech.

There are about 700 US companies currently operating in Insurtech,[122] close to 5 times the number of companies operating in UK Insurtech, the second largest Insurtech ecosystem in the world.[123] Moreover, the US Insurtech ecosystem has produced 10 unicorns, which accounts for 60% of Insurtech unicorns globally.[124] A handful of US Insurtech startups have already gone public (e.g. Lemonade, Oscar, Hippo Insurance). The gap in size between the US and the UK is similarly pronounced in the Lawtech and Accountech ecosystems, respectively accounting for about 800 and 140 companies in the US, about 4 times the number of companies in the respective UK tech sectors.

### Large markets, strong investor appetite and greater access to funding

The size and maturity of these tech sectors are closely tied to a more innovation-driven, risk orientated and entrepreneurial culture, greater access and availability of investors and funding and the colossal size of the corresponding insurance, accounting and legal services sectors.

The US Insurtech ecosystem has attracted close to 2000 investors, about twice the number of investors in UK Insurtech, and over $15 billion (£11 illion)[125] of funding, over ten times the amount of funding amassed by the UK Insurtech.[126] This gap is further pronounced in the Lawtech and Accountech sectors where the US have amassed over $4 billion (£3 billion)[127] and close to $3 billion (£2 billion)[128] of funding, about 20 times the amount received by the respective UK sectors.

The tech sectors in the US largely benefit from access to a large, mature and highly dynamic local venture capital (VC) scene, which, despite the global pandemic, has continued to thrive, hitting new records in 2020. The value of VC funding in the US is estimated to be at $130 billion (£96 billion)[129] in 2020.[130] In comparison, the value of VC funding in Europe is estimated at about $33 billion (£24 billion)[131] in 2020.[132]

VC funds in the US are much larger in size compared to UK and European funds. The average US fund size is estimated to be around $282 million (£217 million)[133] in comparison to the UK which has an average fund size of $168 million (£129 million).[134] The VC scene is also more diversified in terms of expertise to invest at all stages, including key growth stages of start-ups. In comparison, UK and European funds are more targeted on seed funding. Moreover, in comparison to its European and UK counterparts, US VC funds are more risk orientated and place greater emphasis on the ability of start-ups to establish a product-market fit as opposed to revenue.[135] The partners of US VC funds typically have a background in entrepreneurship while in the UK and Europe, senior management in VC funds tend to come from finance, consulting and operations.[136]

Over 50% of investors in US Insurtech, Lawtech and Accountech are local - 20% or less of investors in the corresponding tech sectors in the comparator countries are local. A higher share of local investors can be a huge advantage for start-ups as investors more easily assist with hiring and have better knowledge of the local customer landscape and market than foreign investors.[137]

The large investor appetite can also be explained by the colossal size of the corresponding services sectors in the US. For instance, the US insurance industry amounted to $2.5 trillion (£1.9 trillion)[138] in turnover in 2020, which is over well over one third of the global turnover.[139] By capturing even 0.1% of the US Insurance market, a start-up can potentially achieve as much as $2.5 billion (£1.9 billion)[140] in turnover. In the same vein, US companies and individuals vastly outspend on legal services compared to the rest of the world, contributing to the world's largest legal services sector, estimated at $ 347 billion (£261 billion)[141]as of 2021.[142] Moreover, the US accounting and auditing sector amounts to over $110 billion (£82 billion)[143] of revenues in 2020,[144] which, for context, is close to 18 times the amount of revenues generated by the UK accounting and auditing sector.[145]

### Access to a vast pool of leading talent and skills

The US also leads in terms of talent and skills capacity. In AI research, close to 60% of top-tier researchers are working for American universities and companies.[146] The US is the destination country for most of the brain drain experienced by other countries. In contrast its Western counterparts, the US has maintained excellent talent retention rates, with around 90% of international AI PhD students taking a job in the United States after graduating, and more than 80% staying the country for at least five years after graduating.[147]

# 04.2 Singapore

## Singapore's Lawtech scene has been flourishing - well before the pandemic - thanks to strong government support, a highly skilled workforce and an entrepreneurial legal sector.

### Two large funding support programmes since 2017

In Singapore, the government started supporting law firms in legal tech endeavours by providing funding support for the adoption and implementation of new technologies.

In 2017, the Ministry of Law and SPRING Singapore (now known as 'Enterprise SG') – a government agency focused on enterprise development - launched the Tech Start for Law Programme. Through the programme, law firms in Singapore were given government funding support of up to 70% of the first-year cost of implementation of up to three technology solutions across the areas of practice management, online research and online marketing . In total the government provided S$2.8 million (£1.5 million)[149] and 115 law firms adopted 143 technology solutions under the programme - 99% of these firms were small and medium firms.[150]

Building on the success of the Tech Start for Law programme, the Singaporean government launched the Tech-celerate for Law programme in 2019 as a joint initiative between the Ministry of Law, Enterprise SG, the Law Society of Singapore and the Info-communications Media Development Authority (IMDA). Similarly, the programme provided Singaporean law firms with funding support for up to 80% for the implementation of new technologies. The technologies in scope of the programme ranged from baseline to advanced categories, with products powered by cloud computing and AI. These included.[151]

- Collaborative workflow management platforms
- Cloud-based client intake and legal customer relationship management (CRM) software solutions
- Cloud-based document management systems with complex privacy features and e-signature capabilities
- AI-based predictive document profiling tools
- Legal research platforms and eDiscovery software solutions
- Cloud-based document automation, drafting and proofreading solutions
- AI customer engagement assistant tools that automate the entire customer engagement, KYC, onboarding, updating and e-signing process

In total, the government provided $3.7 million (£2.1 million)[152] of funding support and, as of mid-September 2020, a total of 118 law firms adopted 156 units of new technologies under the programme.

### A 10-year government roadmap for innovation and technology adoption in the legal sector

Further to that, in 2020, the government launched the Technology and Innovation Roadmap (TIR), a sector-wide plan to promote innovation, technology adoption and development in Singapore's legal industry up to 2030.[153] It was developed by the Ministry of Law, in close collaboration with the legal industry.

It was brought into action following the results of a 2018 survey conducted by the government and Law Society of Singapore, which solicited views from practising lawyers on the future of Lawtech and its relevance to Singapore law firms.[154] The majority of respondents agree that the technology is key in the future development of the profession and the sector.

Aimed at law practices and in-house legal teams, the TIR provides information on the key trends and different types of technologies for industry players to be aware of when making strategic decisions regarding their transformation journey. The TIR also includes the roll-out of the various initiatives between 2020 and 2022, to drive up technology innovation and adoption in the legal industry, such as:[155]

- Introduce longer-term funding and a curation or 'whitelist' of suitable technologies to encourage law firms to ongoingly keep up with the latest innovations in Lawtech
- Develop Legal Industry Digital Plan to help law firms assess their digital readiness and identify digital solutions at each stage of their technology transformation journey
- Introduce new frameworks for tools that will be increasingly important in the future, such as AI and cybersecurity
- Develop an affordable and secure cloud-based platform for Lawtech
- Support Lawtech upskilling of existing lawyers (professional upgrading) as well as developing a new generation of tech-ready lawyers by encouraging Law schools to increase technology elements in their curriculum
- Foster the development of a Lawtech hub in Singapore by increasing public-private collaborations as well as collaborations with local research institutions and Singapore-based law firms, and work to attract more global law firms, Lawtech firms, accelerators and incubators

### Moving forward with Lawtech adoption

Meanwhile, Singapore's leading law firms and in-house teams have accelerated their adoption of new technologies, having already established the necessary infrastructure.[156] The large law firms have set-up innovation teams which work around sourcing and/or developing technology solutions that meet the lawyers' needs.[157] Local Lawtech solution providers have also increased their active collaborations with law firms. INTELLLEX – a Singaporean AI knowledge management platform – has been working with Clifford Chance in Singapore to develop a new knowledge management platform that would be able to classify and retrieve documents based on context.[158] While challenges such as conservative attitudes toward technology still persist, the pandemic has further spurred the transition to increased technology adoption. For example, it led to a steep increase in the prevalence of virtual hearings, allowing to reduce the backlog for court cases waiting for trial during the pandemic.[159]

The newer generations of Singaporean lawyers are also more likely to be tech-savvy. By early 2020, Singapore Management University had opened the Centre for Computational Law within its Law Department. The Centre offers courses and conducts research in the intersection between law and technology, training more lawyers to also be proficient in Lawtech.[160]

# 04.3 Germany

## Germany's auditing sector has seen the use of in-house technology development that to overcomes the lack of external developers' appetite and pushes the technological capabilities of a traditional profession.

### A relatively small sector in terms of number of practicing certified auditors

Germany's auditing sector differs from that of the UK in that there is only one certification that provides the legal title of 'Wirtschaftsprüfer' (public auditor), which is issued by the 'Wirtschaftsprüferkammer' (Chamber of Public Auditors).[161] Public auditors exclusively conduct companies' external audits. The certification takes several years of studies, practical experience and examination to obtain and can be valid only as long as the professional remains active and works in a registered audit firm. A professional moving to an internal audit position within industry loses the title of 'public auditor'.

Only public auditors are able to carry out companies' external audits, and work under specific auditing standards that are set by the 'Institut der Wirtschaftsprüfer in Deutschland e.V.' (Institute of Public Auditors in Germany, Incorporated Association (IDW)) – the main professional auditing organisation in Germany. As a result, the market of public auditors, i.e. professionals using these specific standards and corresponding work processes, is quite restricted in Germany, with about 14,000 to 15,000 auditors in total.[162] The small size of this market has limited outside interest from software developers to invest in the development of technologies and tools targeting these specific auditing processes.[163]

### Increased uptake of technology in last two to three years with the Big Four leading the march

Nevertheless, technology is in extensive use within the larger and medium-sized firms in the German auditing sector and has been gaining in momentum in the last two to three years. The march is led by the Big Four (PwC, Deloitte, EY, KPMG) with technology development and adoption rates that are three to four years ahead of the next ten biggest firms in the sector (e.g. BDO, Ebner Stolz, Rodl & Partner, Grant Thornton and Mazars).

Technology in use include:[164]

- Collaboration tools, such as file sharing tools with complex privileged access rule embedding (e.g. HR information cannot be accessed by certain divisions within the client company itself)
- Dashboards with checklist functionalities to ensure that all files and evidence required for an external audit has been requested to the client and/or submitted by the client
- Data analysis tools
- Process mining tools (based on SAP event logs)
- Cloud computing, allowing auditors to work using large volumes of data
- AI tools such as natural language processing tools that can read lease contracts and classify them by type, or quickly go through the notes of financial statements and management reports to check whether certain explanations, addendums and financial figures are included
- Automation of repetitive tasks; although to a limited extent as the complexity of auditing tasks do not lend themselves easily to automation

AI natural language processing tools are currently mainly used by the Big Four but are expected to be widely adopted by the auditing sector with the next ten largest firms expected to integrate the technology into their processes within the next one to two years.

The pandemic has also seen other innovations, such as the use of drones by auditors to perform stocktaking or verify the existence and measure physical infrastructure and assets without having to physically enter the client's site.



AI for Services Report 2022
4 - Global context



### In-house development to make up for a lack of external vendor solutions

The Big Four typically develop their technology in-house and deploy it across their offices globally but do not market it to the rest of the industry.

With a lack of external vendors offering innovative tools and solutions that are specifically adapted to their auditing processes, the large and medium-sized auditing firms in Germany typically develop their own tools in-house. These include anything from advanced Excel macros, to dashboards, to extensions to existing data analysis software such as CaseWare IDEA. Some firms will also outsource the tool development to an IT consultancy or, although less frequently, partner with a software company for a joint development; firms are engaged with research institutes such as the German Research Centre for AI.[165] The IDW is working with the Osnabrück University to identify cross-sector technological innovations (e.g. from the insurance and criminal sectors), that could benefit the auditing sector. With no government grants supporting these initiatives, some auditing firms look to recoup some of the costs associated with developing the tools by selling them to other auditing firms. The IDW has started operating an online marketplace, called Solon X, where auditing firms can sell and purchase these tools developed in-house.[166]

Revenues made from selling these technologies remain limited and the efficiency gains made from using these technologies continue to justify the costs of developing and maintaining these tools. Initially, partners in auditing firms were skeptical about the benefits of technology and unwilling to spend money on development. Funding by auditing firms for the development of in-house technology has strongly increased in the last two to three years, with the pandemic playing its part in pushing attitudes toward technology adoption.

### There remain barriers and challenges to technology adoption

Change management remains a challenge in achieving a more widespread and faster technological adoption within the auditing sector. The profession is relatively conservative and there remains some reservation toward the use and benefits of technology, in particular among the older generations. The skepticism is not completely unfounded as there are instances where regulators have challenged the quality and due diligence of audit processes that seemingly 'over relied' on the use of automated tools and techniques (ATT). In May 2021, the International Auditing and Assurance Standards Board (IAASB) have published a Q&A document to help auditors address the risk of overreliance on technology.[167]

Moreover, challenges remain around aligning these tools with traditional audit methodologies. For instance, the International Standards on Auditing (ISA) are still positioned for traditional audit methodologies. Auditors want to avoid completing audit processes using digital tools, and then having to duplicate efforts by redoing some processes using the traditional approach to meet the ISA requirements.

The use of data analysis tools still faces barriers, as there is limited commonality in data standards and interfaces across the close to two hundred different accounting systems that are used in auditing; the use of data analysis tools still requires extensive time in setting up the data for analysis.

Access to vast amounts of relevant data to train AI tools remains a struggle in the auditing sector. Auditors are limited by ethical and professional requirements as well client confidentiality clauses in their ability to make use of large quantities of relevant and useful client data (including non-financial data).

# 04.4 France

While a late joiner to the tech game compared to its European counterparts in the UK and Germany, the French tech scene, and in particular its Insurtech sector, has been experiencing a steady boom in recent years.

### A fast-growing Insurtech sector

The Insurtech sector in France has been growing rapidly in the last four to five years. The number of Insurtech start-ups grew to 250 in November 2021[168] from 224 in France in January 2021, and over a fivefold increase from 2017.[169] The French Insurtech sector concentrated 21% of Fintech investments in France in 2020, accounting for €174.3 million (£158.6 million).[170,171] Alan and Shift Technology are now 2 of the 8 unicorns in the European Insurtech scene that are French (4 are from the UK, 2 from Germany).[172] The French Insurtech sector concentrated 20% of all Insurtech deals made in Europe in 2021 (second only to UK which engrossed 33% of all European Insurtech deals made in 2021).[173] On a city level, Paris is now the largest Insurtech ecosystem in Europe, followed by London and Berlin.[174]

### Large incumbent insurance market that sees Insurtech as an opportunity to remain competitive

France is the second largest market for the insurance sector in Europe after the UK.[175] The French insurance market is very competitive, both in the life and non-life sectors although concentrated around a few established primarily domestic insurers (e.g. AXA, Credit Agricole, CNP Assurances)

To remain competitive, these large incumbent firms are working at increasing the use of advanced technologies through partnerships with tech firms and start-ups as well as by developing their own in-house solutions (e.g. case study of AXA XL and tech firm Parsyl,[176] diwise by CNP Assurances,[177] CNP Assurances and Insurtech start-up Zelros).[178]

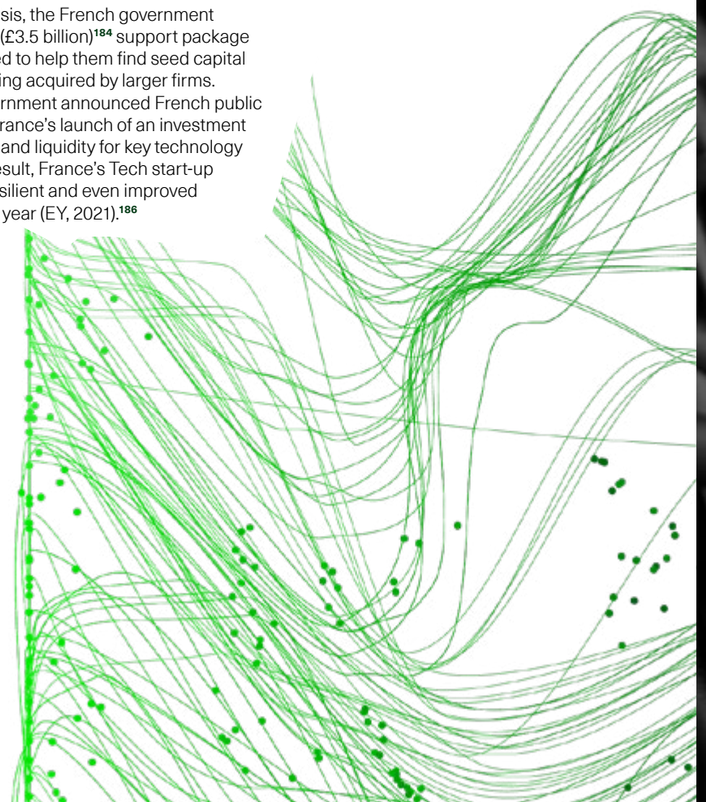
Large incumbent firms are also key investors in Insurtech start-ups. According to a survey of French insurance firms by the Banque de France, incumbent firms perceive Insurtech start-ups (Insurtechs) more generally as an opportunity and potential partners rather than threats.[179] Through partnerships with these players, the incumbent firms look to integrate new technologies, further digitalised workflows and new approaches that they would not be able to develop as fast internally due to a lack of agility or skills availability. Some see partnering with Insurtechs as key to remaining competitive in the face of technology giants such as Facebook and Google - firms that the insurance industry perceives as a potential future threat due to the vast amounts of data they have on their billions of users.[180] Strong interest from a large and competitive incumbent market has been key in the fast-paced growth of the French Insurtech scene. For example, Shift Technology, a Paris-based Insurtech start-up founded in 2013 that created an AI-based solution for insurance firms that detects fraudulent claims already serves about 100 companies and achieved unicorn status in May 2021.[181]

### Strong government support

In addition to strong market appetite and support for growth, the Insurtech sector, and the tech sector in France more broadly, have been receiving strong support from the French Government.

The Government backs a wide range of different funding programmes for start-ups. These include equity-free grant funding that pays a significant share of early-stage start-up costs, grants for start-ups in deep tech that are at a more advanced growth stage, co-investment funds alongside other investors to promote investment in tech.[182] There is also a set of tax incentives to support French start-ups. These include research tax credits, innovation tax credits and the "Young Innovative Company" label which consists of a social expense (tax) exemption on researchers' salaries and a corporation tax exemption. These tax credits are relatively widespread across the Tech start-up scene: according to a 2021 survey of French digital start-ups, 77% (vs. 60% in 2020) of surveyed French start-ups use research tax credit, 64% (vs. 50%) use innovation tax credit and 46% (vs. 42%) obtained the "Young Innovative Company" label.[183]

Amid the Covid-19 crisis, the French government rolled out a €4 billion (£3.5 billion)[184] support package for start-ups, designed to help them find seed capital and to avoid them being acquired by larger firms. Additionally, the government announced French public investment bank Bpifrance's launch of an investment fund offering finance and liquidity for key technology companies.[185] As a result, France's Tech start-up scene proved very resilient and even improved on the pre-pandemic year (EY, 2021).[186]



Amid the Covid-19 crisis, the French government rolled out a €4 billion (£3.5 million) support package for start-ups



AI for Services Report 2022
4 - Global context

# 05 The future of technology in the service sectors

With the digital age well underway, increased adoption of advanced and disruptive technology can provide significant growth opportunities for the UK services sector. The services sectors remain relatively traditional, with a significant share of existing work processes and business models able to benefit from increased technology integration and efficiency gains. Keeping pace with technological innovation in the sector is also key in ensuring that the UK sector remains competitive on a global level and continues to provide world-class products and services to UK consumers and businesses.

The pandemic has accelerated the pace of technology adoption and has had lasting positive effects on attitude toward technology, and awareness of the benefits of technology within the UK services sectors. Nevertheless, the use of cutting-edge technology among incumbent firms remains restricted, at most at pilot stage in the very largest multinational firms (e.g. the Big Four). Moreover, there are a number of challenges and areas for improvement for the sustained technology innovation and adoption growth in the UK services sector. These include the availability of skilled labour within the services sector, commitment to and clear strategies for sustained technology adoption from corporate leadership, targeted government support, availability of large volumes of relevant data for data-driven technology innovations and, associated to the latter point, data security and protection concerns as well as lack of regulatory clarity and/or flexibility regarding how to address these concerns. The UK benefits from a relatively healthy VC scene and dynamic innovation sectors with strong potential for scalability for UK start-ups, including those operating in Insurtech, Lawtech and Accountech. Growth and innovation in these sectors can be pushed further for the UK to keep pace and become a leader in the global race for technology innovation.

Against this background, a SWOT analysis of technology adoption in the services sector was conducted. This analysis feeds into a set of recommendations and lessons for the UK services sector and wider government to overcome these challenges and exploit opportunities for further technology adoption:

1. Strengths: Europe's leading tech innovation capital and strong UK tech funding scene

   Recommendation 1.1: Maintain growth support across UK innovation hubs as a priority in public policy

   Recommendation 1.2: Encourage and support the regional diversification of funding by private investors

2. Weaknesses: Skills availability and development within the services sector

   Recommendation 2.1: Encourage and support staff to develop tech-related skills

   Recommendation 2.2: Initiate upskilling at the early stages of professional development

   Recommendation 2.3: Hire employees with specialist technology skills

3. Opportunities: Lasting effects of the pandemic-induced momentum of technology adoption

   Recommendation 3.1: Set long term technology adoption strategies with dedicated resources and budgets within each firm in the services sector

   Recommendation 3.2 Instigate more initiatives within the services sector to develop relevant and valuable technology

4. Threats: Data limitations – from data security and privacy concerns to regulatory barriers

   Recommendation 4.1: Address gaps in existing data regulation and provide further clarity on how existing rules apply within each sector

   Recommendation 4.2: Develop regulation that promotes technological innovation and adoption in the services sector

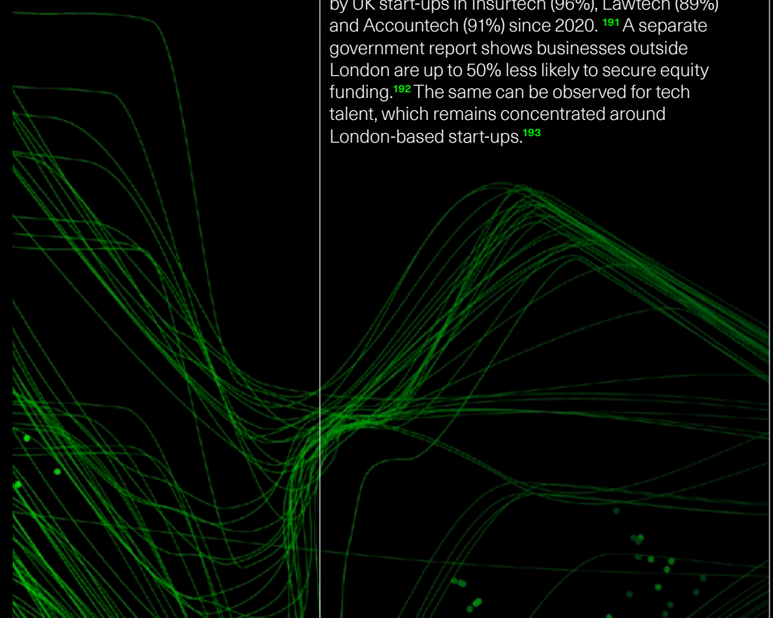




## 05.1 Strengths: Europe's leading tech innovation capital and strong UK tech funding scene

The UK, and London specifically, remain the undisputed European leader in terms of new and active start-ups and size of funding rounds in the tech innovation sector, in particular in Insurtech, Lawtech and Accountech. For example, this study made a conservative estimate of about 150 companies operating in the UK Insurtech sector, which is over twice the number of companies operating in Germany, the second largest Insurtech sector in Europe. A similar gap can be observed in the data for the number of start-ups operating in the Lawtech and Accountech sectors.[187] UK tech start-ups benefit from London's thriving, global financial hub and dynamic VC scene. London-based VC firms reached a new record by raising $9.9 billion (£7.5 billion) [188] in new funds in 2021, accounting for 35% of all new European VC funds raised in the same year. [189] The UK ranks relatively well in terms of number of active investors investing in its Insurtech, Lawtech and Accountech sectors, largely outperforming other leading European innovation hubs (see Section 3).

However, investment activity still remains heavily concentrated in London start-ups[190] despite evidence of success stories in the UK regional tech hubs (e.g. DeadHappy , FreeAgent, Exizent). London concentrates roughly 90% of total funding received by UK start-ups in Insurtech (96%), Lawtech (89%) and Accountech (91%) since 2020. [191] A separate government report shows businesses outside London are up to 50% less likely to secure equity funding.[192] The same can be observed for tech talent, which remains concentrated around London-based start-ups.[193]



**Recommendation 1.1: Maintain growth support across UK innovation hubs as a priority in public policy**

The UK Government has set out ambitious programmes to drive up growth across a multitude of key sectors and areas, including tech innovations, evenly across the UK and has committed to increased support and investment for the less dynamic UK regions (e.g. Build Back Better,[194] Levelling Up the UK).[195] Working in tandem, these initiatives can help make these UK regions more attractive to private investors and tech talent and drive up tech innovation outside London.[196] The government needs to maintain and follow through with its commitment to fuel growth and scale up activity in innovation hubs across the UK.

UK private investors exhibit a certain level of risk aversion (that is greater than US counterparts), with funding growth being driven by an increase in $100M+ investment rounds rather than early-stage investments ($0M – $10M) in UK start-ups.[197] This can further impede the growth of smaller scale innovation hubs outside of London. The government can counteract some of the risk aversion observed among private investors by supporting funding for the early-stage development of tech companies across the UK, providing them with an opportunity to become the next UK unicorn. An example of such public policy initiative is the state-owned British Business Investments (BBI), an arm of the British Business Bank (BBB), which operates the Regional Angels Programme. The programme is aimed at reducing the regional disparities in access to early-stage equity finance for smaller businesses across the UK. It currently has £115 million of committed funds and at the Spending review 2021, the government announced £150 million of funding over three years for the programme.[198]

**Recommendation 1.2: Encourage and support the regional diversification of funding by private investors**

While it is ultimately up to private investors to decide to increase their funding to the UK tech scene outside of London (e.g. through co-investments), national and local government as well as relevant industry organisations can multiple efforts to promote and incentivise them to do so. Investors should be encouraged to take advantage of business costs that are typically lower outside of London and further diversify their funding to tech companies and hubs around the UK.[199]

# 05.2 Weaknesses: Skills availability and development within the services sector

An important factor influencing technology adoption in the UK services sector is the availability of the skills required to understand and make use of new and advanced technologies. However, this report finds that the UK services sectors are still facing a shortage of these skills among employees.

The development and availability of tech skills within the UK services sector is directly tied to the importance of the role played by technology and corresponding tech skills within work processes and business models employed by these sectors. This latter point is in turn influenced by firm leadership committing to - and investing in - business transformation and increased technology adoption. Change needs to come from the top with the implementation of clear, firm-wide and long-term technology adoption and development strategies. This would signal to employees and the industry more broadly that technology and the re-skilling and up-skilling of staff is seen as a priority.

However, this report finds that there remains resistance toward technology adoption among firm leadership in these sectors, in particular in the more traditional auditing and legal sectors. Firm leadership, often composed of older professionals, are less aware and more sceptical of the benefits associated with increased technology adoption and less willing to invest in technology. Some managing partners perceive the streamlining of manual processes using technology as compromising on their quality and overall due diligence. In the legal sector, the older generation of lawyers perceive undertaking these manual tasks without relying on technology as essential training to become the next generation of accomplished lawyers and are less supportive of technology adoption as a result.

**Recommendation 2.1: Encourage and support staff to develop tech-related skills**

There needs to be further change in firm leadership attitude toward technology and long-term commitment to sustained technology adoption. Staff still perceive taking time away from work to improve their tech-related skills as costly to the firm or even unfeasible given their workload and tight timelines for delivery. Staff training for the development of tech skills needs to be further encouraged and supported by firm leadership.

This can also be supported by professional organisations and industry groups by organising more workshops and seminars aimed at improving tech-skills among industry professionals or more generally promoting tech-savviness as an industry standard.

**Recommendation 2.2: Initiate upskilling at the early stages of professional development**

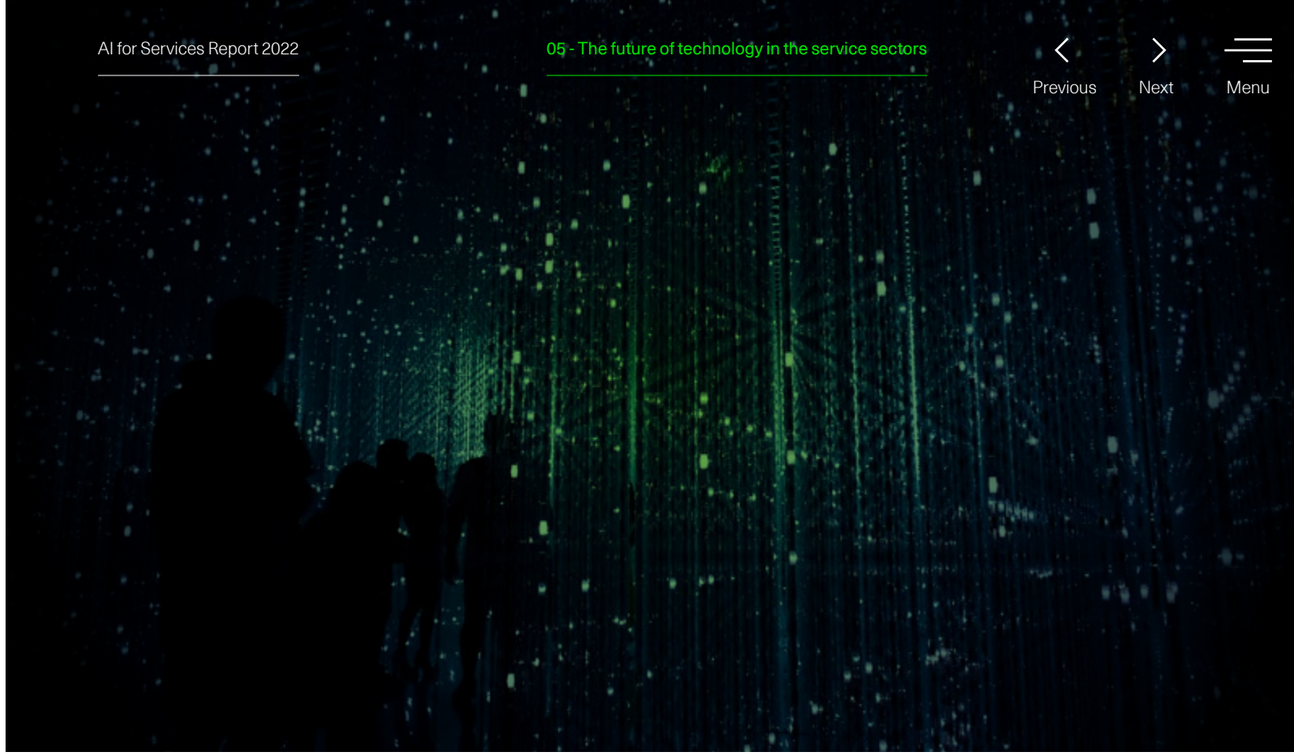
Tech-savvy skills among professionals can be instilled at an earlier stage of their professional development, by integrating more technology-related components in the curriculum at law school, accounting degree at university or professional certification to become an actuary or auditor. For example, one of Singapore's most prestigious universities, opened a research centre within its law school that provides courses in the intersection between law and technology, training more lawyers to also be proficient in Lawtech (see Section 4.2).

**Recommendation 2.3: Hire employees with specialist technology skills**

There is still hesitancy among firms within the services sector to hire additional data scientists and employees with specialist skills within advanced technology areas. These employees are not typical fee-earners and their importance can be discounted when executives focus on maximising their firm's yearly profits. However, the availability of specialist skills will be key for firms to consistently make the most of future opportunities brought about by new and disruptive technologies. Firms also need to focus on longer term outcomes and start investing in staff with specialist skills such as AI knowledge. For example, leading law firms have already started investing in innovation teams whose focus is to leverage on the latest technology trends to enhance existing work processes (see Section 2.2).



AI for Services Report 2022
05 - The future of technology in the service sectors

# 05.3 Opportunities: Lasting effects of the pandemic-induced momentum of technology adoption

Building on the findings of the previous report, this report finds that the pandemic has spurred the rate of technology adoption in the services sector. While businesses were 'forced' to adopt technology to facilitate remote working at the start of the pandemic, they seem to have embraced digital transformation and adoption of new and advanced technology as long-term business strategies. This is likely due to an increase in awareness and understanding of the benefits and potential of technology adoption by businesses in the services sector. Auditing and legal firms who operate on the more conservative end of the spectrum within the services sector have noted a clear shift in attitude toward technology adoption by firm leadership with increased funding and support for in-house technology development initiatives.[200] The push is also coming from below, where new generations of lawyers - who are increasingly aware of the potential for technology to alleviate their workload - are keen to explore new opportunities for increased technology adoption in their work.[201]

**Recommendation 3.1: Set long term technology adoption strategies with dedicated resources and budgets within each firm in the services sector**

Firm leadership needs to define and implement clear, long term technology development and adoption strategies. This includes setting up governance, targets and objectives around technology adoption as well as budgets and resources to commit to meeting those objectives in the long term. Technology is ever evolving at a fast pace -firms will need to assign dedicated resources with budgets of sufficient size to drive technology adoption.

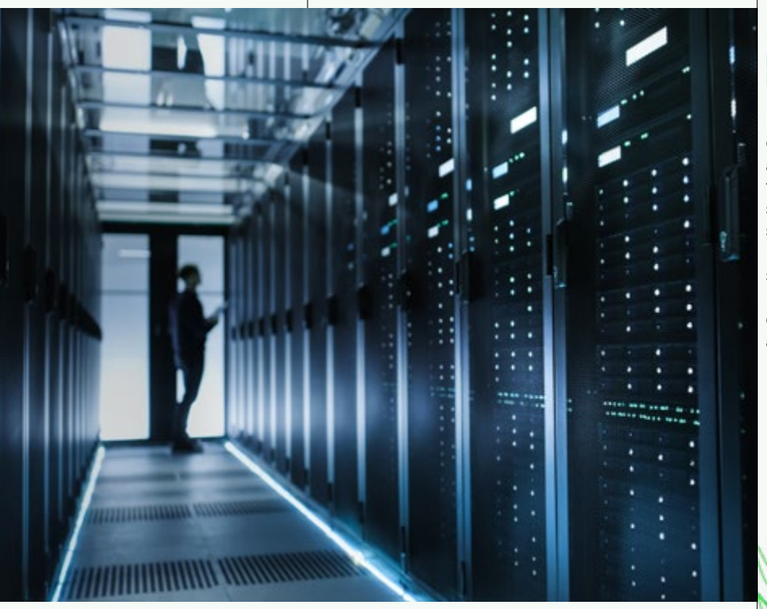
**Recommendation 3.2 Instigate more initiatives within the services sector to develop relevant and valuable technology**

In the legal and auditing services sectors, which are either fragmented or relatively restricted, the market for relevant tools and solutions can be relatively niche and attract limited interest from external vendors. As a result, firms need to be more involved in developing their own technological capabilities. In the legal sector, bespoke solutions are often developed by bundling different technologies and vendor solutions together to serve specific types of client or legal areas.[202] There is also the example of the German auditing firms that have resorted to developing most of their tools in-house, due to a lack of external market appetite, who now sell these tools to each other (see Section 4.3). The development of relevant and valuable technology can be done in-house or through an IT consulting arm, by leveraging on and/or adapting external vendor solutions as well as by taking more of an incubator role and developing partnerships with tech start-ups. Start-ups and incumbent firms within these services sectors benefit from working closely together and developing valuable technology solutions. Close partnerships between incumbent firms and start-ups can also help solve issues associated with the development of technology with limited commercial viability (see Section 2.4).

These initiatives can be further promoted through funding or coordination support from the government and industry organisations (see case study on Singapore in Section 4.2).

# 05.4 Threats: Data limitations – from data security and privacy concerns to regulatory barriers

Data security and privacy concerns as well as regulatory and compliance issues still hinder the development and wider adoption of certain technologies that are reliant on having access to high volumes of relevant data. Firms within the accounting and auditing sectors report that a lack of clarity of regulation regarding data sharing rules and limitations has hindered the development and adoption of certain technology solutions such as AI-based natural language processing tools. For instance, the deployment of cloud computing tools in the German auditing sector was hindered until recently by an initial lack of clarity around the relevant regulation that was cleared up through legal amendments by the German Financial Supervisory Authority.[203]



**Recommendation 4.1: Address gaps in existing data regulation and provide further clarity on how existing rules apply within each sector**

Regulators need to address an evident gap in existing data sharing and processing rules and a lack of clarity regarding how existing rules apply to each sector.

Even within the legal industry, where understanding of regulatory requirements is relatively clear, there are issues of trust among industry players that prevent the extensive data sharing required to unlock the full potential of certain technologies. Regulators or other industry bodies can potentially step in and act as enabler of technology adoption by introducing clear data sharing rules to be adopted by all industry players.[204]

**Recommendation 4.2: Develop regulation that promotes technological innovation and adoption in the services sector**

In the UK, there is potential for regulators to seize on post-Brexit leeway and introduce a more flexible and dynamic regulatory framework that promotes technological innovation and adoption across key sectors of the UK economy, including the services sectors.[205] The new regime should work in close interaction with the relevant innovation and services sectors to develop a forward-looking and targeted regulatory framework that is adapted to issues and challenges specific to the rapidly evolving realm of advanced and disruptive technologies.



AI for Services Report 2022
05 - The future of technology in the service sectors

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# Index of Tables, Figures and Boxes

## Figures

Figure 1: Funding amount received by the UK Lawtech sector: 2015 - 2021 22

Figure 2: Funding amount received by the UK Insurtech sector: 2015 - 2021 22

Figure 3: Funding amount received by the UK Accountech sector: 2015 – 2021 23

Figure 4: Number of active global investors in Insurtech, Lawtech and Accountech per country 24



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