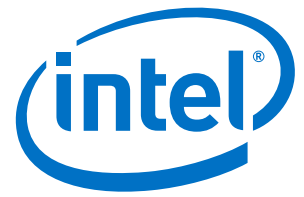


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London
Enabling a
world leading
digital hub



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London: enabling a world leading digital hub

London's technology, media and telecommunications sector (TMT) already supports 8% of the UK's GDP, which includes significant halo effects on the rest of the country. However, there is more the UK can do to become a world leading digital hub.

✓ London TMT sector supports

around **£125bn**
of annual value for the UK economy

8% of GDP

✓ London is an economic engine for the rest of the UK

£26bn of direct economic impact from the London TMT sector

£23bn additional economic contribution for London

£77bn for the rest of the UK

✓ Productivity

Excluding financial services, TMT is more productive than the average industry in London

Economic value per worker*

Technology
£51,000pa



Media
£55,800pa



Telecomms
£116,200pa



*2010 figures

Source: Deloitte. London: ena



ports
country.



One in every ten jobs in London is in the TMT sector



Nearly **50%** of UK media employment is in London



28% of total TMT employment in the UK is in Greater London

✓ **Recommendations**

What more can business and government do to make London a leading digital hub?



Skills:
nurture talent that combines creative and tech skills



Tech finance:
close the funding gap for UK tech businesses to grow global



Community:
drive collaboration between businesses, universities and institutions



Connectivity:
provide fast connectivity to underpin digital innovation

Figures may not sum due to rounding

Enabling a world leading digital hub



Foreword

At the heart of the UK's thriving technology, media and telecommunications sector, London has emerged in recent years as a centre for innovation in online products and services. Providing growth and jobs, a community of entrepreneurs is slowly changing the face of the old East End, and creating a focus for talent that is inspiring a new generation.

As web developers, programmers, financiers and marketers build the area that has become known as Tech City, the opportunity has emerged to harness London's resources further to become a global leader in digital technology, for the benefit of the broader UK economy.

This report, compiled by Deloitte with the help of EMC², Intel and London First, aims to develop a vision for London's digital future, and to show how the city can exploit its potential to further the economic contribution of the technology, media and telecommunications (TMT) sector, exceeding the significant progress already made.

As Tech City attracts inward investment and promotes exports, it is hoped London will leverage its creative and technology capability more widely to lead globally in digital creative product development across media, online games and apps, advertising and platforms.

The foundations of London's digital potential are already in place. The London media industry is a hive of talent and inspiration, producing print, broadcast and online content that are consumed and recognised globally. The capital is home to telecommunications giants and technology innovators and, together with the media sector, they generate an estimated £125 billion of annual value for the UK economy, amounting to 8 per cent of GDP.

The UK is already one of the world's largest digital economies, with high levels of penetration across broadband, smartphone and television. Supported by leading financial and advertising sectors, it is not difficult to imagine a digital industry that could make a significant difference to the broader economy.

This report combines a quantitative analysis of the TMT sector, disaggregating the current financial and demographic landscape, with a series of surveys and interviews with stakeholders in the UK's digital development.

It shows the wider benefits of the TMT sector, which go far beyond direct employment, and identifies areas that may be of interest to business leaders and policy makers as they develop strategies for London's digital future.

Along the way the report looks at the capital's many advantages and considers where improvements can be made. While London is well placed to exploit its status, resources and diversity, there is no guarantee it will achieve its ambitions, and we cite specific challenges in the areas of skills and finance.

The scale of the task should not be underestimated, and is intensified by efforts in cities such as New York and Berlin to build digital hubs. It is important that business leaders, the Mayor's office and the government work together to enable London as a world leading digital hub.

The report presents a set of key recommendations which may help policymakers plan a way forward. These focus on addressing the challenges in skills and finance and boosting efforts in collaboration and in infrastructure.

The opportunity is within reach but, as rivals accelerate their efforts, London must take steps to realise the ambition. The consequences of failing to do so are significant, both for London and the wider UK economy.

Finally, our thanks to those who have helped in the production of this report and its recommendations. We welcome your feedback and comments.

Executive summary

London: a world-class city ...

London is one of the world's great cities; a diverse and multicultural environment and a magnet for people and talent, located in the ideal time zone for global business. London's combination of diverse commercial interests, good travel connections and excellence in higher education, culture and financial services make it an ideal destination for British and international organisations.

... and world-leading media hub

The UK media industry, with London at its heart, is a global leader. The UK is home to one of the largest indigenous broadcast content markets and boasts a world-leading advertising industry. Television, publishing and advertising together generate more than 6 per cent of the UK economy's total exports.¹ Around half of UK media employment is in London.

Building on its strength in media, the UK has developed into one of the largest digital economies, powered by a technology-savvy consumer. Broadband, smartphone and digital television penetration is among the highest worldwide. The UK has the strongest global e-commerce market, with UK consumers spending most online per person and watching most online TV among the largest nations.²

... which together with the technology and telecommunications sectors, make a significant economic contribution

Technology, media and telecommunications (TMT) in aggregate have an enormous economic impact in London and the UK, well beyond the number of people the sectors collectively employ or their direct economic contribution.

The sector's economic contribution is a function of Information and Communications Technology (ICT) and media's enablement of information, communication and knowledge; ICT's enablement of the e-commerce revolution; and connectivity. London's TMT sector generates around £125 billion annually, or 8 per cent of GDP.

Half the economic contribution of London TMT stems from the narrow effects of employment and spending, while broad effects contribute the remainder. The latter are derived from the roles of ICT and advertising in driving the economy.

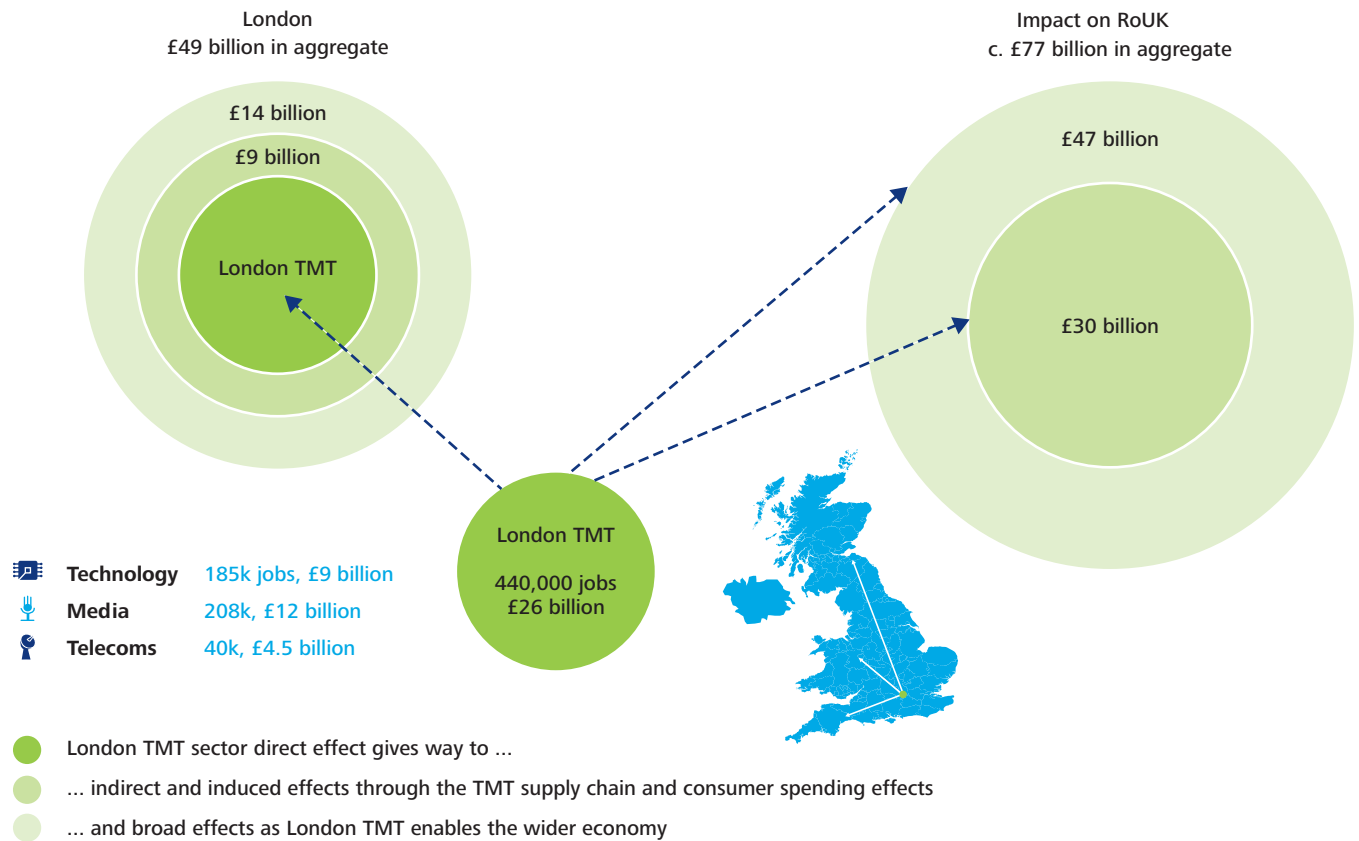
London is an economic engine for the rest of the UK. The £26 billion of direct economic impact (Gross Value Added) from the London TMT sector leads to an additional £23 billion of economic contribution for London and £77 billion for the rest of the UK. The benefit for the rest of the UK is composed of £30 billion from the London TMT sector's purchases and employee spending, and £47 billion from broader impacts.



“London is not just a bunch of impressive numbers; it is also an astonishing human artefact. A city that a generation ago was on the skids has become a place where the world meets to study, work, create, invent, make friends and fall in love. It is Britain's economic and cultural powerhouse, Europe's only properly global city and a magnet for rich and poor, from anywhere and everywhere.”

The Economist³.

London TMT generates c. £125 billion of economic impact (GVA) for the UK through narrow and broad effects



However, the impact could be substantially increased ...

London is well placed to leverage its strong position in media and financial services, its world class city status and heavy digital consumption market to become a world-leader in the digital economy, with commensurate benefits for the rest of the UK. In terms of the potential of a truly digital capability, the city has only just begun.

As a global city and a creative, cultural and artistic hub, London is well suited to support new digital start-ups. London's strengths mean that it is a magnet for talented and young people. These young creative individuals provide the talent pool to nurture new digital creative tech start-ups.

The digital revolution requires companies that harness both leading edge digital technology and creativity. Businesses need not only to understand and build the technology, but be able to develop their offerings creatively. The new wave of technology start-ups has a digital and creative base, across music, film, photography, design, fashion or content, to name a few.

This report sets out a 'call to action' to make London the world-leader in the digital economy, commercialising the UK's world-class creative skills in the digital environment.

This aims to make London the global hub for digital media content, online games and apps, interactive online advertising and digital platforms, capitalising on trends including big data, cloud computing and machine-to-machine and leveraging the opportunities offered by 4G superfast broadband.

London is well placed to achieve this ambition, trading on its many strengths, including its world-class city status, media specialisms, financial services, technology-savvy consumer and position in Fin-tech, retail tech and cybersecurity.

“We have the advantage of sitting between the creative and tech sectors. We should play to our strength which is creating digital content, games, applications, etc.”

Executive, UK Media Company

There are potentially significant benefits from positioning London as the world-leading digital hub. Excluding financial services, the London TMT sector is more productive than the average industry in London, and provides the higher-productivity jobs that the government's growth agenda demands for the UK's future economic success. By taking a greater share of domestic and export markets, its total economic contribution can be substantial.

Technology productivity is currently the lowest of the three TMT sectors. That suggests growth can be boosted by enhancing not just TMT as a whole, but technology specifically, to further develop the UK's digital creative technology capability.

To be successful, research skills to produce valuable intellectual property need to be developed, and be financed and supported by a committed tech finance sector, creating a virtuous circle of innovation and growth for the UK. Talent that masters both creative and technology skills needs to be nurtured, to maximise the potential of the digital revolution for the UK.

This will require addressing two areas of weakness:

- **A skills shortage in relation to digital research and innovation.** The UK ranks sixteenth in student performance in science, behind countries including Canada, Australia, New Zealand, Japan, China and Singapore, according to OECD data.⁴ The relatively low rating is reflected, alongside other factors, in the UK's lower tech R&D intensity as a proportion of GDP, compared with nations such as Israel and the United States. The UK's business R&D in tech as a proportion of GDP is 0.08 per cent, compared with 1.2 per cent in Israel and 0.3 per cent in the United States.
- **The financial sector's tepid support of UK tech businesses.** Financial services should be encouraged to engage with tech risk and take a longer term view of investments. The estimated value of technology venture capital investment in the United Kingdom is one tenth of that in Silicon Valley, taking into account the relative sizes of the UK and US economies. That is manifested in the comparatively limited scale of the UK market for early stage funding, and contrasts with Israel, where the financial services and venture capital sectors have led the growth of the tech sector, resulting in Israel having more companies listed on the New York-based NASDAQ exchange than any other country outside North America and China.



The scope for addressing these challenges is reflected in the average value of M&A tech deals, which is lower in the case of UK bidders (£40 million per deal on average) than in the United States (£160 million per deal) and the rest of the EU and Asia (both £110 million per deal).⁵

Interviews carried out for this study suggest the differences in track record between UK and US tech companies often relate to relative risk appetite and ambition, with the United States having a much more sophisticated culture of risk taking, and US tech businesses harbouring genuinely global and long-term ambitions. Interviewees reminded us, for example, that Mark Zuckerberg declined to sell Facebook in its early years, taking on significant risk, and has now achieved a one billion user business.

Still, there are signs of change, with leading new media and technology companies selecting London for new offices, ranging from Facebook's first ex-US engineering centre, focused on mobile content, to Amazon's 47,000 sq. ft. office, aimed at creating interactive digital services for TV, game consoles, smartphones and PCs. Google's new King's Cross headquarters will provide workspaces, free Wi-Fi and mentorship opportunities for technology businesses.⁶

London faces competition, but if focused on a clear vision it can succeed ...

London is not the only hub to have taken notice of the opportunity. New York is developing a digital media hub, initially grown organically but now with explicit government assistance. The city has encouraged science and engineering campuses and closer collaboration between academia and business.

In Europe, Berlin is growing its presence in digital content, leveraging strengths in arts and media and attracting increasing numbers of software companies.⁷

Silicon Valley and Israel, although less likely to be direct competitors to London, provide valuable lessons on developing technology communities. The success of Silicon Valley was underpinned (in part) by business networks, comprising small and large firms, universities and venture capital firms. The close links between the business community and the universities of Stanford and Berkeley are noted, alongside the acceptance of and ability to learn from failure. Israel's success, meanwhile, has been supported by a financial services sector which has helped tech businesses become global players.

London may not compete head on with Silicon Valley with its infrastructure for pure technology start-ups, but if it leverages its strengths it can help launch the next wave of innovative specialist digital technology businesses. If it does not ally technology to its strengths, there is a real danger the UK will miss the opportunity to grow as an innovation-based economy. At its starkest, this creates the risk that London may, over time, acquire a reputation as a sales centre, rather than a centre for engineering.

“Failure is often seen as a badge of honour for US entrepreneurs, whereas in the UK failure is seen as a stigma. Providing funding to early stage companies is a very high risk investment activity. Silicon Valley VCs (such as Kleiner Perkins, DFJ, Accel, Benchmark etc) have a model where one star investment (Facebook or Google) will compensate for many failures. In general UK investors just do not have this level of appetite for risk.”

Stakeholder, TMT industry

Recommendations

The final part of this report turns to the potential for specific responses to the opportunities and challenges described. Below is a summary of the key action points, which it is hoped may be adopted by business leaders, policy makers and stakeholders in seeking to make London a world-leading digital creative hub.

These have been informed through over 30 interviews with TMT corporates and an SME survey, conducted for this study. The recommendations are described further in the main body of the report.

Skills: Develop the skills required to thrive in the digital economy, through cross-fertilisation between industry and universities and ensuring students have the opportunity to acquire world-class ICT skills.

Echoing the tech personalities of Silicon Valley, the UK should find its own champions and media and technology business should look for opportunities to knowledge-share and cross-fertilise.

London universities are already working with companies such as Intel, Cisco and the BBC to collaborate on research and innovation, but more could be done. They should also strive to nurture relationships with alumni working in the technology sector, who may provide mentoring and support, and look for global collaborations with other technology academic institutions (in the way New York City partnered with Cornell and Technion to deliver their Applied Sciences Campus).

Many young creatives come to study in London at leading art and cultural institutions, fashion institutes, music academies, drama and film schools. These institutions are highly regarded for their creative courses and can be the conduit to digitally enabling the next generation of talent. This may be done through exchange schemes where world class technology academic institutions connect their entrepreneurial students with creative students from the London schools to build ideas together. To help support this, creative and technology industry organisations could be encouraged to sponsor these projects.

Schools must continue to take steps to incorporate the teaching of technology and programming skills into curricula across disciplines. Government and industry should support projects like Code Club, where volunteers with programming skills attend schools to teach children aged 9 to 11.

“We need to clarify how the London hub intends to compete against other global hubs. The different areas of the Greater London hub should be focusing on specialising on what each is good at. London – financial services, media etc; Oxford/Cambridge – general technology, biotechnology, etc”.

CFO, UK Media Company

Technology finance: Address the funding gap for UK technology businesses to grow globally.

The interviews conducted for this study indicated there is a funding gap for UK technology companies between £500,000 and £4 million (Series A),⁸ and that London should leverage its strong financial services sector to address this shortfall.

The government has started to take steps and last year announced proposals to create a government-funded bank for SMEs.⁹ There are tax breaks in place for early-stage investors (Enterprise Investment Scheme (EIS), Seed Enterprise Investment Scheme (SEIS) and Venture Capital Trusts (VCT) reliefs)¹⁰ and the London Stock Exchange has introduced the High Growth Segment which makes the public markets an option to companies growing at over 20 per cent a year.¹¹ Qualifying limits for investment in small companies through venture capital trusts and enterprise investment schemes have also been recently relaxed through the Finance Act 2012.¹²

BIS, together with Her Majesty's Treasury, should encourage venture capital and bank lending to smaller technology businesses through facilitating loans to small and medium sized TMT businesses, for example through the government-funded bank. Government should explore the development of solutions to challenges around Series A funding.

The financial services industry could examine options to sharpen the skills to appraise investment opportunities in technology companies, building on examples such as Silicon Valley Bank which is importing these skills to London. Pension funds should be explicitly targeted as potential investors; technology businesses should seek to explain their business models and income projections in a way that can demonstrate potential to investors looking for specific and long-term investments. Newer forms of financing may also offer opportunities. For example, Crowdcube has recently joined Seedrs as the UK's second FSA regulated crowd-funding business.

Community: Create a collaborative community environment among London start-ups, businesses and universities.

London has made a series of positive moves, with examples including TechHub and Central Working developing communities and co-working spaces in the capital. Canary Wharf Group has also opened 'Level 39' to host Fin-tech accelerator programmes. The iCity will offer new opportunities on the Olympic Park, which will also add to the environment. The Investment Organisation has been instrumental in helping to promote and support these initiatives.

To build on these, this report recommends the London business community, supported by business organisations, and the Mayor launch a promotional strategy based on community collaboration and entrepreneurship events and conferences, building on existing initiatives such as the Founders Forum, Digital Sizzle, and the 'failure' event with Jimmy Wales during the Olympics.

The Mayor of London should seek to make London a world leading 'Smart City', working with the business community, which can provide the required technologies and infrastructures, and building on work being completed by the Technology Strategy Board, as well as projects taking place in other cities, such as the Mayor of Boston's Office of New Urban Mechanics.

London's business community should provide support through the development of local hubs and provision of affordable space, shared procurement services, mentoring opportunities and sponsorship.

Central government should develop policies that enable London as a global digital hub as part of its broader growth strategy.

Connectivity: Ensure London is at the forefront of fast connectivity to underpin digital innovation.

Additional spectrum, due to come on line in coming months, will be used by mobile operators to run Long Term Evolution (LTE) (4G) services, providing speed, volume and security for digital communications. This could lead to new applications in areas as diverse as interactive education, telemedicine, shopping, entertainment and recreation, all of which is expected to make a significant contribution to UK economic growth.¹³

The government also plans to fund super-fast fibre optic networks in selected UK cities including London,¹⁴ and to take further steps to simplify the planning process to support the swifter roll out of 4G.¹⁵

One potential drag on growth is the planning process for infrastructure projects, which requires the buy-in of multiple local authorities in London and can lead to bottlenecks. The Growth and Infrastructure Bill, which proposes to relax some planning restrictions to assist communications providers to deploy fibre infrastructure, is expected to help address the constraints.

In our SME survey, participants identify improving the IT infrastructure as a policy priority. This report recommends that implementation of super-fast broadband is accelerated in some business and residential London locations to underpin digital innovation, keeping London always at the forefront of fast connectivity, and that the Mayor leads a strategy for connectivity across London forcing greater coordination of the London local authorities.



General business environment and infrastructure: maintain a favourable environment.

Alongside specific measures to support TMT, interviews carried out for this study stressed the sector is reliant on the wider business environment. Interviewees highlighted the following:

- the government must continue to balance the imperative for students and qualified individuals and their families to move to and engage in the UK growth economy with other considerations. This is key to attracting high calibre talent. The government has established an entrepreneur's visa, but interviewees indicated that the issue presents a potential ongoing challenge
- the government has made positive steps towards ensuring the UK has a competitive personal tax scheme, and it is important the personal tax environment remains stable and predictable
- the need for the government to accelerate its review of airport hub capacity in the South East, and articulate a vision for resolving this constraint, however provided. The plans for Crossrail in London will help connect elements of the London TMT cluster and Heathrow.

The ambition set out in this report is consistent with the objective of initiatives such as Open Innovation 2.0, which aims to promote a sustainable economy and society by developing widespread innovation literacy in Europe.¹⁶

London: a world-leader in digital creative product development

Skills



- Exchange schemes to be developed between the UK world class technology academic institutions and creative/business schools.
- The business sector to create technology champion personalities.
- UK schools to continue to take steps to incorporate the teaching of technology and programming skills into curricula.
- The exchange of experiences between media and technology businesses to be fostered.
- London universities to look for global collaborations with other technology academic institutions.

“We need to develop the human capital, linking higher education and business ... London is good for fashion, but what about media and technology?”

Tech finance



- BIS, together with HMT, to encourage venture capital and bank lending to smaller technology businesses.
- Government to explore the development of solutions to challenges around Series A funding.
- The financial services industry to examine options to sharpen the professional skills that are required to appraise investment opportunities in technology companies.
- Exemplar markets like the US and Canada to be studied to inform how to enhance conditions for UK technology businesses access to finance.
- The UK technology business community to target pensions funds for these to invest in technology.

“UK investors take a very short-term view of return and are more risk averse than investors for example in Silicon Valley.”

Community



- London’s business community to provide the environment and infrastructure to support the development of local hubs. This support could encompass the provision of affordable space, shared procurement services, mentoring opportunities or sponsorship.
- The business community and the Mayor to organise conferences similar to Failcon in Silicon Valley, building on the failure event with Jimmy Wales during the Olympics.
- The Mayor of London to lead the world in relation to “Smart Cities” by developing a comprehensive definition and vision for a “Smart London”.
- Central government to support the initiative by developing policies that enable London as a global digital hub as part of its broader growth strategy.

“The Government should drive people’s aspirations to build big businesses, not just sell when the business becomes mid-size.”

Connectivity



- Government and industry to work together to provide super-fast broadband of 1GB in certain business and residential areas in London wherever possible.
- Government to work with the communications industry to ensure London is always at the forefront of fast connectivity to underpin digital innovation.
- The Mayor of London to champion a London-wide strategy for connectivity across London.

“Reliability, capacity and speed of IT infrastructure are critical to our ability to remain competitive.”

General business environment

Including environment to attract qualified individuals, personal tax and airport infrastructure

London: A world-class city

London is recognised as one of the great cities of the world,¹⁷ supported by its enormous economic and cultural capital. It is the largest agglomeration in the European Union,¹⁸ and more languages are spoken in London than any other city.¹⁹ London is a world leader in higher education, with a “disproportionate number of internationally well-regarded universities”.²⁰ The city hosts three of the world’s top 10 galleries and museums.²¹

Our programme of research for this study, which included over 30 interviews with TMT corporates and an SME survey,²² highlights that London is a magnet for talent and their families, making the city a hub for innovation, education, research and arts and culture.

A critical mass of complementary businesses and the ability to be close to customers and policy-makers are important attractions. The clustering of TMT providers and buyers from a range of sectors, who can help each other grow, is seen as an advantage in comparison to cities such as Berlin. For international businesses, London’s exceptional connections, favourable time zone and English language make it an appealing location.

Our SME survey finds a number of reasons to locate in London, including transport links, TMT infrastructure, a skilled labour force, proximity of customers and presence of similar organisations. Other reasons include its reputation, the presence of the City of London, the emerging and eclectic culture of East London and the fact that London is already a media hub.

London’s strengths were a factor influencing, for example, Facebook’s choice of the capital as the base for its first ex-US engineering centre. According to Facebook’s Vice President of Engineering Mike Schroepfer, London was the clear choice after exploring a number of cities across Europe. “When you look at all the places where we have put engineering centres there are two defining factors: there has to be an indigenous talent base, and an indigenous educational system. Cambridge is not very far away.” The thriving internet start-up scene in London was also said to have factored heavily in the decision.²³



The London TMT sector's narrow economic effects

The London TMT sector's physical footprint creates economic value for the UK

The London TMT sector's narrow economic contribution arises from:

- The profits, wages and taxes of TMT organisations located in London (direct impacts).
- Purchases of intermediate inputs from suppliers along value chains, such as the independent production sector in the case of broadcasters (indirect impacts).
- Knock-on economic effects as direct and indirect impacts flow through the economy and generate consumer spending (induced impacts).

Economic impact is measured in terms of Gross Value Added (GVA) and jobs created. GVA is analogous to GDP contribution.

This analysis captures economic activity in London from London-based TMT organisations. It includes the economic impact on the rest of the UK as a result of purchases from suppliers and from employees spending their wages outside London, but excludes the economic impact from TMT organisations located in the rest of the UK, to isolate London's impact.

2.1 Direct economic impact

Employment

London is a hive of TMT employment activity. Some 28 per cent (441,000) of total TMT employees in the UK work in Greater London, compared with 15 per cent across all sectors of the economy. TMT represents 10 per cent of London employment.

Technology, media and telecommunications command a greater share of TMT employment in Greater London than the other sectors of the economy. However, media (around 46 per cent of the UK's activity in London) is much more concentrated than technology (around 21 per cent of activity) or telecommunications (19 per cent).

Whilst technology and media employ around 200,000 people in London each, telecoms employment numbers in London are comparatively lower.

Figure 2.1.a, opposite, shows the level of employment in each of the TMT sectors in 2010 for UK and Greater London, ranked by London's share of employment.

Value added and productivity

TMT organisations located in London collectively produced £26 billion of GVA in 2010, or 10 per cent of London's GVA.²⁴

Excluding financial services, TMT is more productive than the average industry in London.²⁵ Telecommunications sees the highest productivity (£116,200 per annum) with media and technology productivity slightly lower than average (£55,800 and £51,000 respectively).

These aggregations mask a number of sub-sectors where productivity in London is high or low. For example, average productivity in media tends to be dragged down by the inclusion of culture sectors, although the spill over impact of the cultural sector is vitally significant to London's strength as an attractive place to live and do business, and the media and ICT sectors have wider catalytic effects for the economy, as described later in this report.



Figure 2.1.a. TMT enabler sector employment in the UK and London, 2010

TMT sub-sector	TMT Direct Employment		London: UK (%)
	UK	London	
Public administration and regulation (part only)	1,300	1,300	100.0
TV programming and broadcasting	17,400	15,100	86.8
Sound recording and music publishing activities	5,900	3,500	59.3
News and information service activities	18,400	10,200	55.4
Motion picture, TV and video activities	85,500	44,900	52.5
Arts and art related activities	62,100	32,400	52.2
Advertising and media representation	95,300	42,800	44.9
Radio broadcasting	7,500	2,900	38.7
Publishing of books, newspapers and periodicals	140,500	49,800	35.4
Web portals	3,200	1,000	31.3
Printing and recorded media and related activities	13,700	4,100	29.9
Publishing of computer games and software	9,200	2,600	28.3
Computer consulting activities	287,800	79,500	27.6
Other IT and computer activities	127,500	34,500	27.1
Data processing, hosting etc	37,800	9,700	25.7
Computer programming activities	104,400	25,600	24.5
Repair of computers, peripherals and comms. equipment	37,500	9,000	24.0
Other telecoms activities	185,400	35,900	19.4
Wired telecoms activities	5,300	1,000	18.9
Technology wholesale	81,600	9,900	12.1
Wireless and satellite telecoms activities	19,000	1,900	10.0
Technology manufacturing and research	250,200	23,800	9.5
Technology sub-total	892,500	184,000	20.6
Media sub-total	455,500	208,300	45.7
Telecoms sub-total	209,700	38,800	18.5
Cross-cutting sub-total	38,800	10,300	26.5
TMT direct total	1,596,500	441,400	27.6
All economy total	27,814,900	4,336,300	15.6

Source: Deloitte analysis, based on ONS data (BRES and ABI/ABS).

Note: 'Cross-cutting' includes 'Repair of computers, peripherals and communications' and a small share of 'Public Administration' to account for communications regulators and authorities.

Figure 2.1.b shows the direct effects of TMT in London in terms of GVA productivity (GVA per worker) and employment.

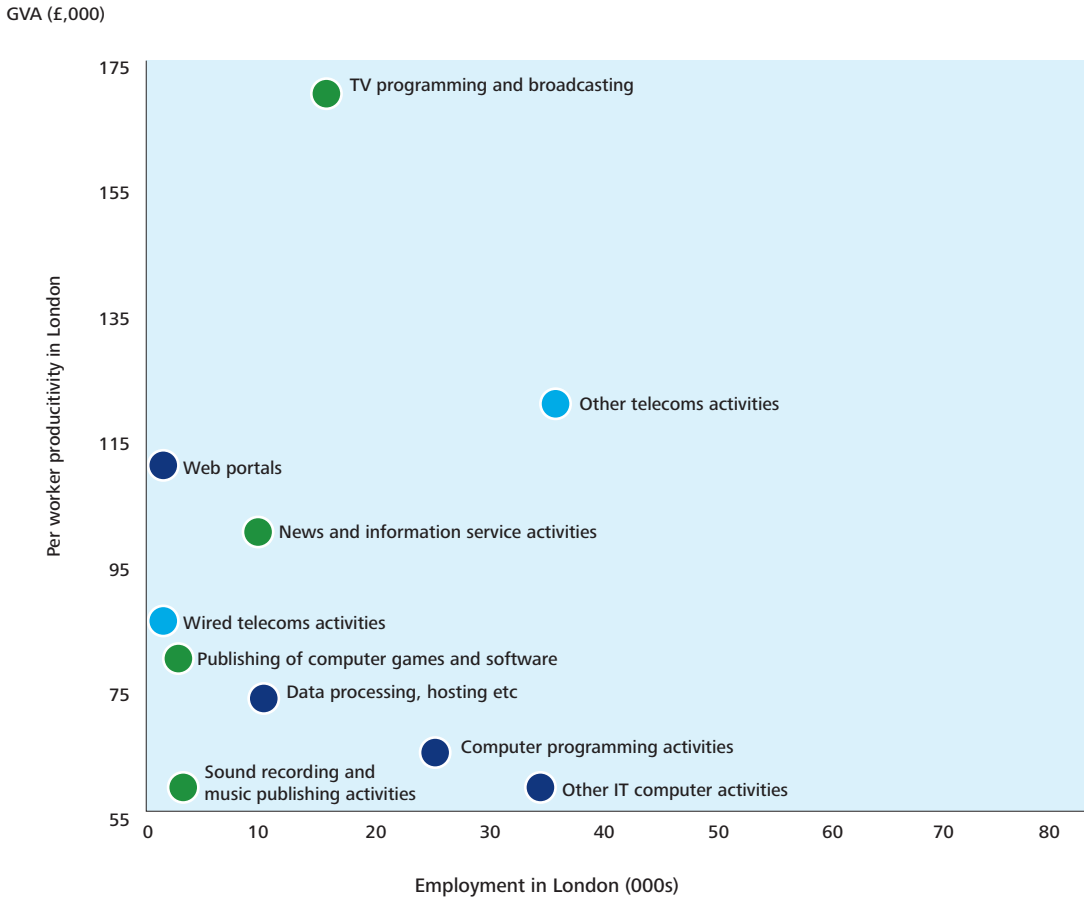
The scatterplot chart opposite, shows 10 sub-sectors that are above or around the average per worker productivity of £58,500 in London's TMT sector. The sub-sectors are colour coded for each data point: technology (dark blue), media (green) and telecommunications (light blue).

Figure 2.1.b. TMT direct employment and value added (VA) in London, 2010²⁶

	TMT direct employment London	TMT per worker productivity (£,000) London		TMT per worker productivity differential (100 = TMT Average)	TMT direct GVA (£m, London)
Public administration and regulation (part only)	1,300	41.0	◆	70	53
TV programming	15,100	172.9	●	290	2,611
Sound recording and music publishing activities	3,500	56.7	▲	97	199
News and information service activities	10,200	101.2	●	173	1,032
Motion picture, TV and video activities	44,900	35.5	◆	61	1,596
Arts and art related activities	32,400	39.0	◆	67	1,262
Advertising and media representation	42,800	50.6	▲	87	2,165
Radio broadcasting	2,900	42.4	◆	73	123
Publishing of books, newspapers and periodicals	49,800	45.1	▲	77	2,247
Web portals	1,000	111.4	●	191	111
Printing and recorded media and related activities	4,100	41.7	◆	71	171
Publishing of computer games and software	2,600	80.0	●	137	208
Computer consulting activities	79,500	43.1	◆	74	3,423
Other IT and computer activities	34,500	58.8	●	101	2,028
Data processing, hosting etc	9,700	76.6	●	131	743
Computer programming activities	25,600	62.9	●	108	1,610
Repair of computers, peripherals and comms. equipment	9,000	27.3	◆	47	246
Other telecoms activities	35,900	121.7	●	208	4,368
Wired telecoms activities	1,000	85.4	●	146	85
Technology wholesale	9,900	41.0	◆	70	406
Wireless and satellite telecoms activities	1,900	29.4	◆	50	56
Technology manufacturing and research	23,800	44.4	▲	76	1,057
Technology sub-total	184,000	51.0	▲	87	9,379
Media sub-total	208,300	55.8	▲	95	11,613
Telecoms sub-total	38,800	116.2	●	199	4,509
Cross-cutting sub-total	10,300	29.1	◆	50	299
TMT direct total	441,400	58.5		100	25,800

Source: Deloitte analysis, based on ONS data (BRES and ABI/ABS); Note: the traffic light system denoting low (red); average (amber); and high (green).

Figure 2.1.c. Above average TMT direct productivity per worker versus employment in London, 2010²⁶



Source: Deloitte analysis, ONS surveys including ABS 2011.

TV programming & broadcasting produces the highest level of productivity in London – above £170,000 per annum, which likely results from the exports of programmes.

Technology, media and telecommunications each have one sub-sector in the top three. Other telecoms activities (including specialised telecommunications services, such as satellite tracking, communications telemetry, and radar station operations²⁷) and web portals produce productivity per worker in excess of £100,000 per annum. All three are relatively capital intensive.

News and information services, wired telecommunications services, computer games and software and data processing or hosting feature predominantly.

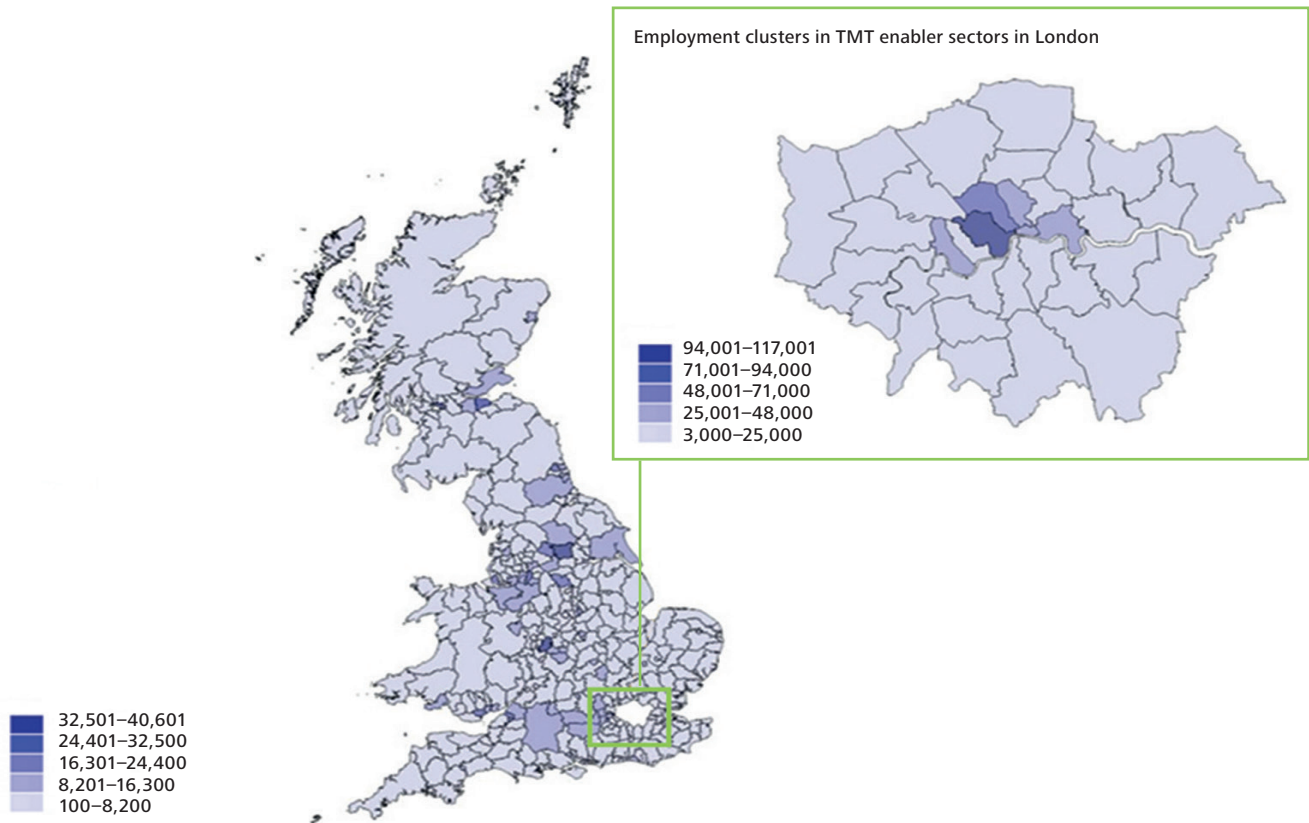
Future growth in these high productivity sectors would contribute significantly to London’s GVA, but given their generally lower labour intensity, they might contribute less by way of employment growth, at least in direct terms.

Geographical spread of employment

Many TMT jobs are concentrated in central London (Figure 2.1.d), with other concentrations of TMT activity in certain other UK conurbations.

In particular, the boroughs of Westminster, Camden, Islington, Tower Hamlets and Hounslow show the highest absolute levels of TMT direct employment. Silicon Roundabout (also known as Tech City) is at the intersection of Islington and Hackney. Hackney also shows an above average incidence of TMT direct activity.

Figure 2.1.d. TMT enabler sector employment in UK and London, 2010



Source: Deloitte analysis, based on ONS data (BRES and ABI/ABS)

Geographical spread of real estate occupation

The strong presence of TMT employment in London is reflected in the sector’s occupation of real estate space, amounting to 25 million sq. ft. across central London. Some 70 per cent of this space is in core London office locations in the West End, City or Midtown.

This places the TMT industry in third position in terms of occupation levels, accounting for 13 per cent of total office space, behind financial services (23 per cent) and professional services (15 per cent). The media sector accounts for the majority of space, with almost 17 million sq. ft., 68 per cent of the TMT total.²⁸

Media is concentrated in Soho, north of Oxford Street and around Covent Garden. Telcos and tech firms are mostly located in EC1 and Canary Wharf.

In keeping with the employment analysis, London is the centre of media activity in the UK.

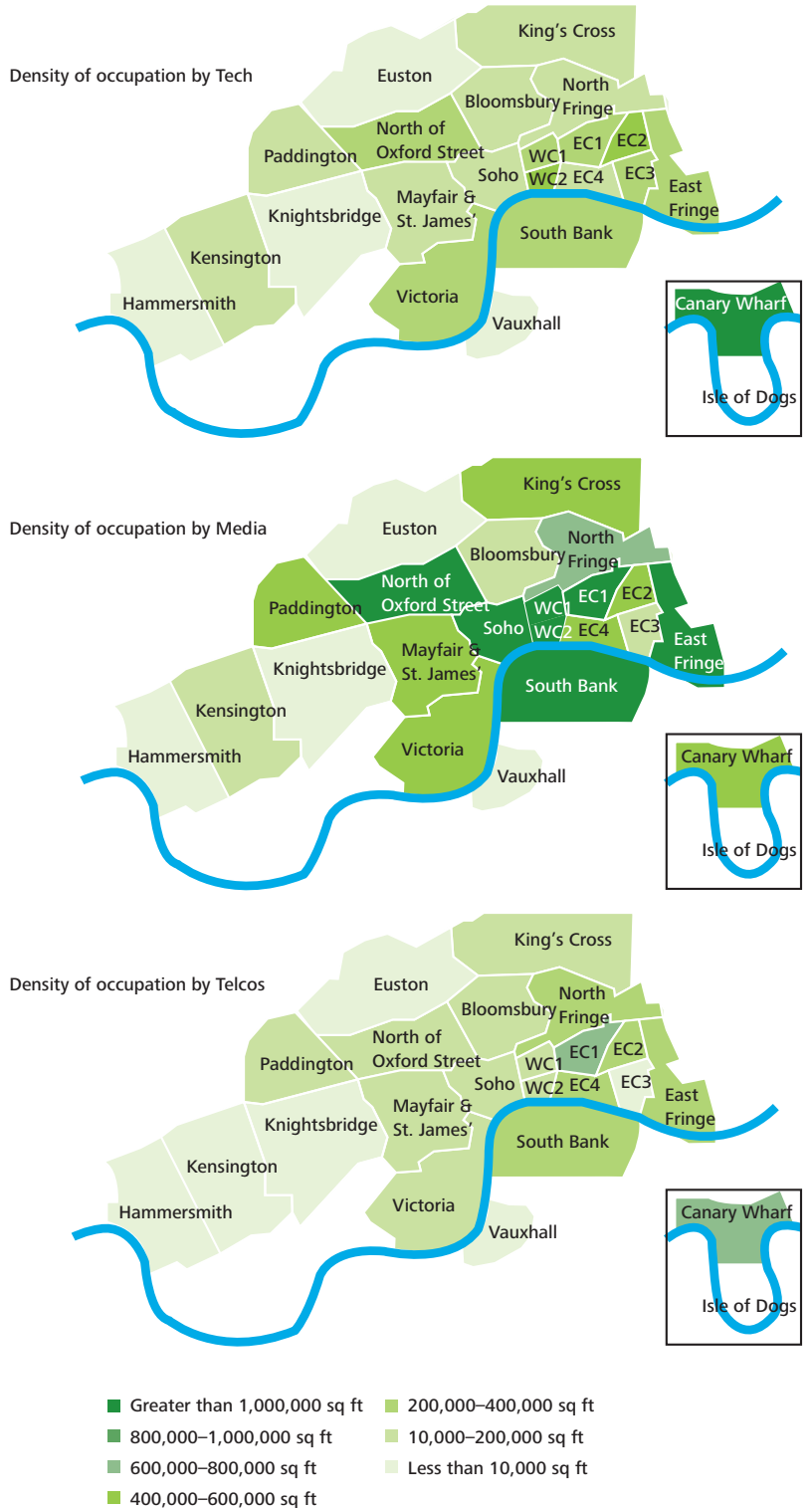
Growth quantum

A comparison of the TMT sector and its constituent parts shows that London fared much better than areas outside the capital between 2007 and 2010.

During this period the London TMT sector grew by more than 10,000 jobs. This represented a 0.9 per cent per annum increase, compared with a drop of 1.6 per cent in the UK as a whole.

Whilst the TMT sector has contracted in the rest of the UK, TMT job growth in London will have supported growth in non-TMT jobs throughout the rest of the UK over this period. This is evidence of London TMT’s wider contribution as an employment driver.

Figure 2.1.e. TMT density of occupation by type, 2010



Source: Deloitte analysis

Figure 2.1.f. Annual average growth (CAGR) in TMT employees: London and the UK, 2007–2010²⁹

	2007		2010		CAGR % (2007–10)	
	UK	London	UK	London	UK	London
Technology sub-total	873,200	148,200	821,300	165,400	● -2.0 ● 3.7	
Media sub-total	473,000	196,100	430,800	189,600	● -3.1 ● -1.1	
Telecoms sub-total	204,000	44,300	204,600	38,000	● 0.1 ● -5.0	
Cross-cutting sub-total	18,300	3,300	37,000	5,900	● 26.4 ● 44.2	
TMT Direct total	1,568,600	391,900	1,493,700	402,900	● -1.6 ● 0.9	

Source: Deloitte analysis, based on ONS data (BRES and ABI/ABS).

* Red denotes contraction/green denotes growth.

Employment growth in London was driven by technology, where more than 15,000 jobs were added. Telecoms, where employment has remained fairly stable at national level, decreased by 5 per cent a year in London. Media employment in London shrank by around 1 per cent a year over the period, with regional media losing 3 per cent (14,000 jobs) a year. The significant increase in the cross-cutting total is due to an increase in technology repairs.

The employment numbers demonstrate the sector's resilience and indicate it may flourish in an improving macroeconomic environment and deliver growth for the UK.

2.2 Total narrow economic impact

The narrow economic impact in London from the physical footprint of London TMT organisations amounts to 655,000 jobs and £35 billion in value added (VA).

This stems from direct impacts and knock-on effects through the upstream supply-chain and consumer spending (indirect and induced effects respectively).

Figure 2.2.a. TMT total narrow employment and VA in London and rest of UK (RoUK), 2010

		London	RoUK
Direct	Employment	441,400	–
	Value added (£m)	25,800	–
Indirect	Employment	99,700	190,600
	Value added (£m)	4,900	9,500
Induced	Employment	114,000	409,200
	Value added (£m)	3,800	20,700
Total	Employment	655,100	599,800
	Value added (£m)	34,600	30,200
As % London direct TMT	Employment		135.9%
	Value added (£m)		117.1%

Source: Deloitte analysis.

Employment growth in London was driven by technology, where more than 15,000 jobs were added.

Some 75 per cent of VA effect and 67 per cent of employment effect in London is contributed directly by the TMT sector, with the rest resulting from supply-chain purchases and consumer spending. This again is reflective of relative per worker productivity across sectors. TMT workers tend to be more productive than workers in the sectors that supply TMT and the sectors which provide goods or services bought by TMT employees.

Estimates suggest the direct TMT sector in London generates more knock-on economic activity in the rest of the UK than in London. £1m of direct TMT VA in London generates a further £340,000 VA in the London economy, and an additional £1.2m VA outside London.

In aggregate the TMT sector in London supports employment of 600,000 people and VA of £30 billion in the rest of the UK. These estimates represent jobs related to TMT activity in London across all sectors, rather than specific TMT jobs outside London. This demonstrates the reach of London's TMT hub across the UK.

Total narrow impact in sub-categories: technology, media and telecommunications

Of the £34.6 billion total economic impact in London, media in conjunction with its suppliers and related consumer spending, accounts for just under half of the total, with a GVA impact of £16 billion.

Technology accounts for around 35 per cent of the total (£12 billion) with telecommunications accounting for £6 billion. Cross-cutting accounts for just less than £0.5 billion.

These relativities are reflected in the total narrow employment generated across all sectors, with more than 305,000 jobs attributable to media, 266,000 to technology and 65,000 to telecoms.

Cross-cutting activities such as regulation lead to relatively low order total narrow impacts.



Figure 2.2.b. TMT total narrow employment and VA in London by segment, 2010

Employment	Direct	Indirect	Induced	Total
Technology sub-total	184,000	29,800	52,500	266,300
Media sub-total	208,300	53,800	43,700	305,800
Telecoms sub-total	38,800	13,500	12,600	64,900
Cross-cutting sub-total	10,300	2,600	5,200	18,100
Total	441,400	99,700	114,000	655,100

GVA	Direct	Indirect	Induced	Total
Technology sub-total	9,400	1,500	1,300	12,200
Media sub-total	11,600	2,600	2,000	16,200
Telecoms sub-total	4,500	700	500	5,700
Cross-cutting sub-total	300	100	100	500
Total	25,800	4,900	3,800	34,600

Source: Deloitte analysis, based on ONS data (BRES and ABI/ABS). All figures rounded.

Tech R&D activity

One reason the UK lags competitors in technology activity and productivity is relatively low investment in research and development (R&D). This was noted by numerous stakeholders during study interviews, and appears to be borne out by data.

The World Economic Forum's Global Competitiveness Index (GCI) ranks the UK 10th globally in innovation and 12th in company R&D activity (behind the US, Israel and Germany).

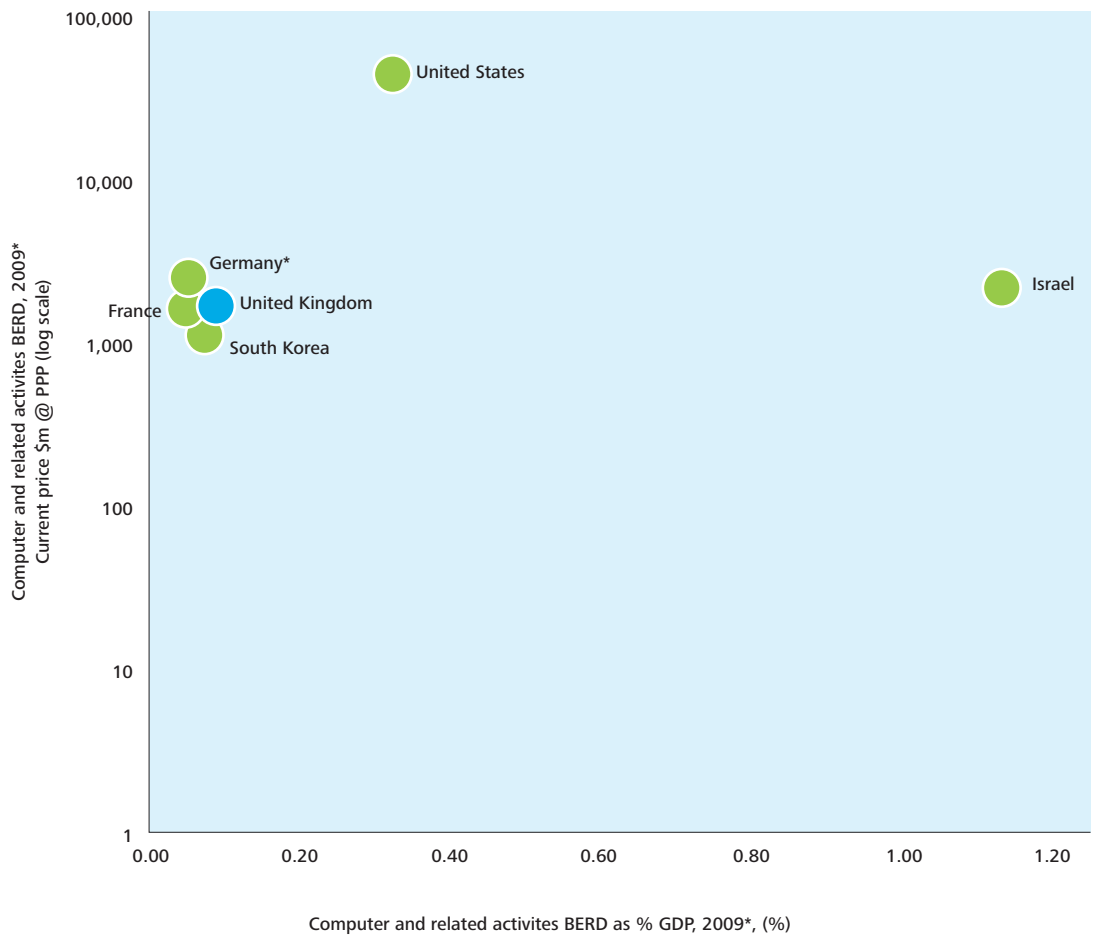
The Organisation for Economic Co-operation & Development (OECD), publishes Business Expenditure on R&D (BERD) statistics across sectors for most member states.

Whilst the database has a number of shortcomings, including missing data and years, it is possible to consider benchmarks for the UK in terms of the absolute level of tech-related BERD and tech-related BERD as a proportion of GDP for 2009.

Those numbers indicate the United States is far ahead in absolute terms with \$44 billion BERD (2009, \$PPP Current Prices), and that Israel leads in terms of BERD as a proportion of GDP, at 1.2 per cent. The UK is clustered with France, Germany and South Korea – the UK's BERD in tech is \$1.7 billion and represents 0.08 per cent of GDP on this measure.

There is some way to go for the UK to catch up with the United States.

Figure 2.1.e. Technology R&D activity, selected countries, 2009



Source: OECD, Deloitte analysis

* NB: France and Germany data is 2007

Tech venture capital

For UK tech businesses to grow, the financial services industry must help provide funding and leadership. This is illustrated by the current size of UK market for early stage funding, which is limited compared with the United States.

London technology companies received private equity and venture capital investment of around £450 million in 2010. UK-wide venture capital investment in technology was just over 10 per cent of total private equity investment³⁰ (suggesting the London figure would be in the order of £50 million). This contrasts with estimated total venture capital investment accruing to Silicon Valley in 2010 in the order of £4 billion.³¹ After weighting for the relative sizes of the UK and US economies, technology venture capital investment in Silicon Valley is more than ten times the amount in London.

Tech M&A activity

Figure 2.1.d shows in the year to March 2013 the average value of M&A tech deals in the UK was £40 million, compared with £160 million in the United States and £110 million in the rest of the EU and Asia.

However, the UK does compete on other benchmark measures; notably the number of deals per million population. Whilst the average deal value is the lowest of the areas considered, the UK has a similar number of deals per head of population as rival regions. However, by value of tech M&A activity per head of population, the United Kingdom still lags the United States by a significant margin.

Figure 2.1.d. Technology M&A activity, selected regions, 2012–13

Region (bidder location)*	Number of deals	Deal value (£m)	Number of deals for which deal value is known	Percentage of number of deals for which deal value is known	Deal value (in £m) per deal for which deal values are known	Number of deals per million population	Deal value per head of population (£)
UK	160	4,085	109	68%	37	2.5	65
US	763	53,426	327	43%	163	2.4	169
EU (excluding UK)	321	11,764	101	31%	116	0.7	27
Asia	319	24,994	227	71%	110	0.1	6

Source: MergerMarket, Deloitte analysis

Note: The sectors included are “Biotechnology, computer services, computer software; computer: hardware, computer: semiconductors”; only deals between 15/03/2012–15/03/2013 are included.

Broad effects of London TMT: Driving productivity through digital, media and ICT

The London TMT sector makes a significant contribution to the UK economy, which goes beyond the economic contribution it generates from its physical footprint described in the previous chapter.

This economic contribution stems from media and ICT's central role in facilitating information flows and the development of e-commerce, as well as connectivity's role in supporting communication. This contribution is expected to become even larger as the UK rolls out 4G broadband, extending the impact of the Internet by enabling services such as interactive education, telemedicine and augmented shopping.

Media

The UK media industry is world-class, with London at its centre. The UK is one of the world's largest indigenous broadcast content markets,³² and has one of the most successful advertising industries. UK advertising agencies are first globally in terms of creativity awards (population indexed).³³ World-famous UK broadcasters and publishers and UK global advertising agency groups have their headquarters in London.

The media industry plays a fundamental role in enabling the knowledge economy, providing access to information through a variety of means, including broadcast, newspapers, books, magazines and advertising, all of which are increasingly provided by and consumed through digital platforms.

Half the UK population owns or has access to five or more digital portable devices, and more than 20 per cent have e-book readers.³⁴ UK consumers use online TV most among developed nations.³⁵ Digital media consumption supports the development of digital skills, creating further economic benefits.

Through social media, the sector enables social interactions, communication and e-commerce.

Another example of the broad impact of the media sector stems from the advertising industry, which plays a critical role in the economy, for example by helping to bring new innovations to market, or by encouraging competition between existing or new firms.

Given its breadth, quantifying the total contribution of the London media sector to the UK economy is an almost impossible task.

A partial illustration is provided by quantifying the London advertising sector's contribution. A study by Deloitte estimates advertising adds £100 billion a year to the UK economy.³⁶ In line with the share of London in national advertising employment (45 per cent), it is estimated that £45 billion of that economic impact arises from the London advertising sector. This assumes UK ad spend is on campaigns commissioned from ad agencies based in the UK only.



The economic impact generated by the London advertising sector is estimated to be £10 billion in London and £35 billion in the rest of the United Kingdom. This assumes that the economic benefit from the London advertising sector is split between London and the rest of the UK in line with their respective shares of UK GVA (London's share was around 22 per cent in 2011).³⁷

Digital economy

Nearly £1 in every £5 of sales in the United Kingdom takes place online or through electronic means.³⁸

This includes sales through websites, such as consumers making purchases on Amazon and e-Bay, which represent one quarter of the total. B2B purchases through online computer networks comprise the remaining three quarters.

Electronic communications and the Internet have had a significant impact on competition and the efficiency of markets by reducing geographic barriers to trade, enabling smaller firms to participate in global marketplaces and driving cross-border transactions.³⁹

The Internet allows small businesses to reach customers easily. Some 80 per cent of smaller UK businesses have a website. More than 50 per cent of small businesses electronic sales are via a website.⁴⁰

These sales generate an economic impact for the UK economy, which captures factors such as profits for UK firms and wages paid to UK employees.

While some of the value generated by online sales is substitution from offline channels, e-commerce is expected to lead to incremental economic effects. As e-commerce is enabled by ICT, this effect is expected to be included in the impact of ICT estimates in the next section.

ICT infrastructure

Investment in ICT improves productivity and increases efficiency by helping create networks, and decentralising and reducing transaction costs. In the case of e-commerce, it increases competition by making markets more global.⁴¹ Areas of innovation, such as ICT-enabled big data and cloud computing are creating productivity-enhancing opportunities.

The EU KLEMS consortium⁴² estimates that ICT contributes around 5 per cent of UK economic output by making sectors more productive, equivalent to c. £65 billion. This relates to ICT used in the United Kingdom, whether it is produced nationally or imported.



Some of the ICT infrastructure is expected to be created in London, rather than being imported or created in other parts of the UK, as a result of:

- ICT being customised to suit the needs of UK businesses based on conversations that take place in London between technology providers and their customers.
- Technology design and production capability being located in the Greater London area. For example, one global technology provider tells us it has more than 1,000 engineers in Greater London; other businesses indicate that some network design and hardware build is executed in London.

It is therefore reasonable to expect that the London TMT sector contributes to the crafting and development of some ICT used in the United Kingdom, at least at stages in the chain, perhaps even if just at the stage of customising it to the local market.

The proportion of ICT used in the United Kingdom which stems from the London TMT sector is calculated using ICT contributions by sector (from EU KLEMS),⁴³ and deducting imports and out of London UK production (the latter is approximated by the share of UK TMT employment located outside London). The proportion of ICT used, generated by the London TMT sector, is assumed to be the same in London and the rest of the United Kingdom in any particular sector. The differences in the sectoral composition of the London economy and the rest of the UK are taken into account in the calculation of the economic impact effect of ICT.

“Technology companies are becoming increasingly service-orientated and need to customise products to deal with local customs and laws. The multicultural and diverse workforce in London helps with this”.

Global Technology Player

In aggregate, ICT infrastructure designed or customised in London is estimated to contribute £4.5 billion to the London economy, by supporting a higher VA in the sectors that use ICT. This is more than 1.5 per cent of the London economy’s total VA. London ICT makes the highest contribution to the banking and finance sector in terms of absolute value (a contribution of £1.4 billion, representing 4 per cent of the sector’s total London VA).

In addition, it is estimated that ICT infrastructure designed or customised in London contributes £12.2 billion to the economy of the rest of the UK.

VA supported by London ICT helps pay wages and taxes, and generates profits, across the relevant sectors that use ICT.

London TMT is estimated to contribute £16.7 billion, or one quarter, of the economic contribution from ICT in the UK. As the economy transitions to digital, making London a leading global digital creative hub can provide a platform for the London TMT sector to increase its contribution to ICT in the UK, for the economic benefit of the country as a whole.

“Some hardware is built in London. The design of the network is done in London. Hardware and core software are bought in. I would estimate that 70–80 per cent of our ICT is imported from outside London (and most of that is from overseas)”.

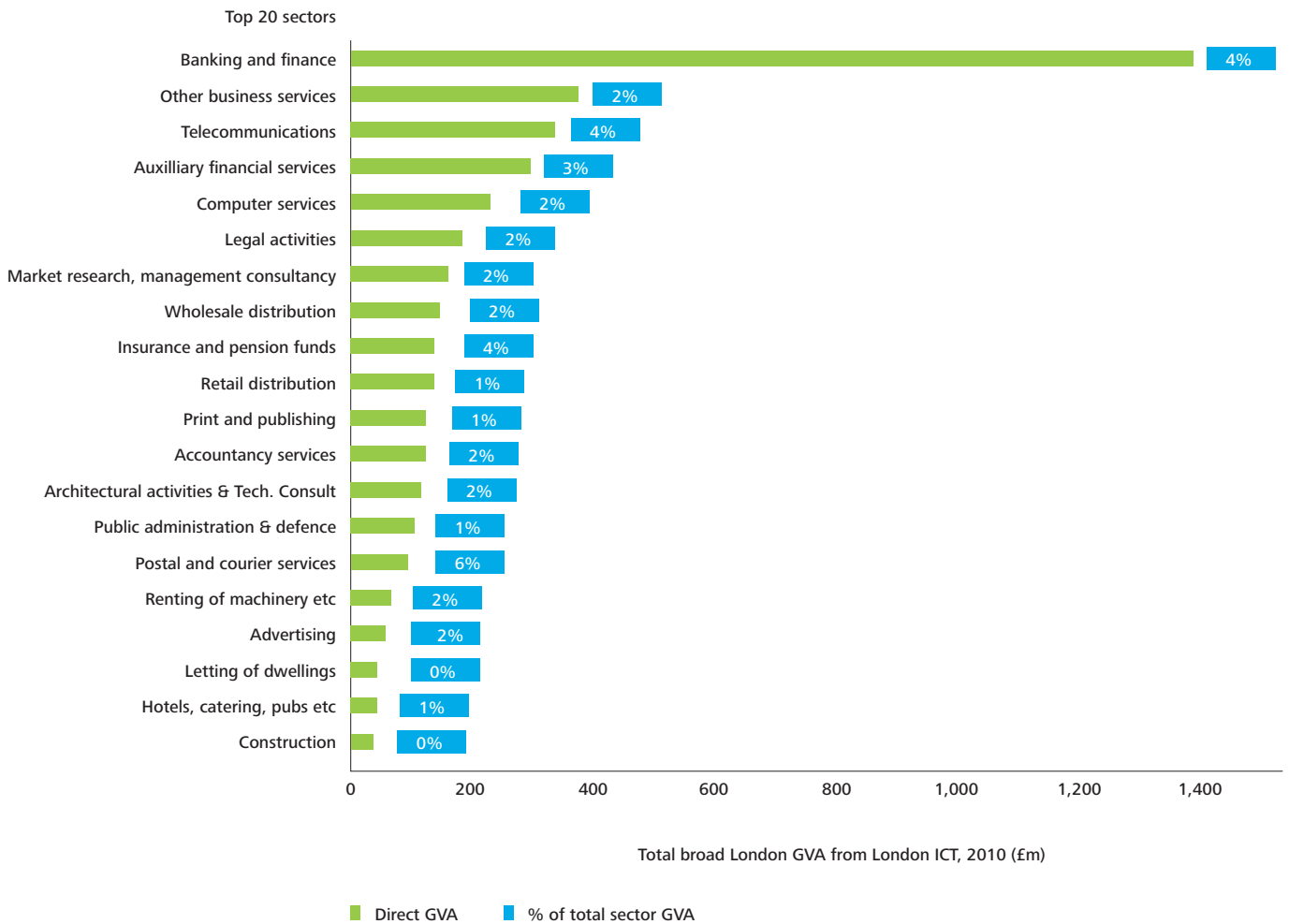
National telecommunications operator

Total broad effects

In aggregate, it is estimated that London TMT has wealth-creating effects on the UK economy amounting to c.£62 billion. The impact on the London economy is c.£14 billion, and the impact on the rest of the UK is £47 billion.

The broad effects estimate results from both ICT (a total of, c.£17 billion economic impact) and advertising impacts (£45 billion).

Figure 4.a. London ICT contribution to London VA by sector, top 20 sectors 2010



Source: Deloitte analysis

Why does London need to be a hub?

Our interviewees note a number of benefits from being located in a cluster like London, including the presence of similar businesses, proximity to customers and ability to attract talent. Hubs like Silicon Valley testify to the benefit of clusters, which lead to higher productivity, for example as a result of knowledge spill overs.⁴⁴

Increasing the depth and breadth of London's TMT capability will deliver agglomeration benefits to the sector, the wider London economy and the rest of the UK. It will also allow the UK to compete with other global locations seeking to develop leadership in the digital economy, most notably New York, but also Berlin and Israel.

The presence of regional clusters has been found to have a significant impact on entrepreneurship:⁴⁵

- Industries located in regions with strong clusters experience higher growth in new business formation and start-up employment.
- Strong clusters are associated with the establishment of some existing firms.
- Clusters contribute to start-up firm survival.

Analysis of cluster performance across a number of industries in the United States finds significant evidence of positive effects on employment, wages and innovation.⁴⁶ Industries participating in a strong cluster (i.e. a large presence of other related industries) register higher employment growth, along with stronger growth of wages and number of patents issued.

Doubling the size of the UK creative sector cluster would increase the productivity of firms in the cluster.⁴⁷ Studies using non-UK data find that doubling the size of clusters increases the productivity of firms in the cluster by between 5 and 20 per cent.⁴⁸



Lessons from other international hubs

London is well placed to leverage its strong position in media and become a world-leader in the digital economy. However it will need to up its game to stay ahead of the competition.⁴⁹

New York is developing a digital media hub, initially grown organically but now with explicit government assistance. Israel has a strong digital economy, with more than sixty companies listed on the NASDAQ exchange, the most of any country outside North America and China.⁵⁰

The Silicon Valley cluster provides useful lessons for London, although most of the growth of the cluster has been organic rather than the result of government initiatives. Other cities have also sought to develop clusters, with varying degrees of success.⁵¹

The following sets out some key features of clusters.

Culture, collaboration and mentoring

A success factor for Silicon Valley is its strong physical social networks and a culture of collaboration and mentoring, allowing ideas and talent to flow through the ecosystem.⁵² Silicon Valley also has a positive attitude to risk taking and is tolerant of failure. An example is Failcon, a conference where entrepreneurs and venture capitalists share lessons learned from experiences.⁵³

New York has provided explicit support to its digital media hub through mentoring and networking services. Two applied science and engineering campuses (Cornell University, Centre for Urban Science and Progress) are being developed to nurture the hub. The new Cornell campus is a joint venture with Technion (Israel Institute of Technology), which demonstrates recognition of the benefits of global links.⁵⁴

Talent pool

Silicon Valley has a substantial talent pool, due to the presence of universities such as Stanford and Berkeley. Close links and cross-fertilisation between the universities and the TMT industry have ensured a supply of workers with the appropriate skill set.⁵⁵ Stanford has actively encouraged faculty and graduates to start their own companies, and keep relationships going with post-graduates who come back and invest in future students. Frederick Terman, a Stanford dean during the 1950s, was credited with nurturing Hewlett-Packard, Varian Associates and other high-tech firms.⁵⁶ Other hubs have maintained open labour markets to attract talent.

Access to finance

Angel and venture capital firms with a strong understanding of the TMT industry and of digital businesses have played a central role in Silicon Valley's success.⁵⁷ Silicon Valley is reported to account for one-third of venture capital investment in the United States, with £1 billion pounds⁵⁸ invested in US-based companies in the first quarter of 2010 alone.⁵⁹

In New York, the NY Entrepreneurial Fund matches \$3 million of public money with \$19 million from a local venture capital firm.⁶⁰

The government of Israel has previously backed technological incubator programs to help entrepreneurs with an innovative technological idea to turn the idea into a product.⁶¹



Recommendations

London is well-placed to take advantage of its status and resources to become the leading developer of digital creative technology services. However, to achieve its aims the city must exploit its strengths and attend to its relative areas of weakness.

This report recommends business leaders, policy makers and stakeholders take action around four key areas: addressing the skills gap, increasing financing opportunities for technology businesses, boosting community collaboration and improving connectivity.

Skills: Develop the skills required to thrive in the digital economy, through cross-fertilisation between industry and universities and ensuring students acquire world-class ICT skills.

There are already some great examples of successful collaboration between London universities and businesses. Intel is working with University College London (UCL) and Imperial College to create Intel's global centre for research and innovation. One aim is to drive the development of computing solutions that enhance the sustainability of cities. Cisco, UCL and DC Thomson are partnering to set up an innovation hub and the BBC has created a strategic partnership with UCL for R&D in digital media, which will be shared with the wider industry. However, London's universities need to do more to connect to business, as per the recommendations below.

Many of the young creatives come to study in London at leading art and cultural institutions, fashion institutes, music academies, drama and film schools. These institutions are highly regarded for their creative courses, and can be the conduit to digitally enabling the next generation of talent.

The recent government decision to revise ICT teaching in schools was welcomed as a positive development, but could go further to ensure digital skills are embedded in all disciplines. For example, an arts graduate should know how to use digital tools and techniques to maximise value from content generation.

To further develop the skills to thrive in the digital environment this report recommends:

- technology champions are created in the business sector, in the way of globally recognized Silicon Valley business personalities, to make technology appealing to a broader constituency;
- exchange schemes are developed where world class technology academic institutions buddy up their entrepreneurial students with students from the creative schools to build ideas together. To help support these creative alliances other creative and technology industry organisations could be encouraged to sponsor these workshops and hot house environments with access to development platforms, staff time and resources and funding for prizes, competitions, internships and sponsorship;
- UK schools continue to take steps to incorporate the teaching of technology and programming skills into curricula from an early stage and across disciplines. Government and business should support projects like Code Club, where volunteers with programming skills attend schools to teach children aged 9 to 11, and provide funding to support teachers;
- corporate and professional organizations foster exchanges of experience between media and technology businesses, through further mentoring, apprenticeships and internships;
- London universities seek global collaboration with technology academic institutions, in the way New York has partnered with Technion (Israel's Institute of Technology); and
- London universities maintain relationships with alumni working in the technology sector and leverage those relationships to share experiences with students and develop internship opportunities.

“UK universities are too academically focused. They need to be better integrated with employers; employability of skills needs to be built in the curriculum. Places like Silicon Valley made investments into education that may have appeared unrealistic or risky at the time, but have been a key driver of the hub’s success.”

Executive, Education Publisher.

Technology finance: Address the funding gap for UK technology businesses to grow globally.

Interviews conducted for this project indicate there is a funding gap of between £500,000 and £4 million (Series A) for UK technology companies. This is consistent with a series of academic studies and has long been a concern for the Department of Trade and Industry (DTI) and Department for Business Innovation & Skills (BIS). Profitable medium-sized companies sometimes have recourse to private equity funding, but often are acquired by overseas players, particularly US corporates.

London has a strong financial services sector, which it should leverage to address funding issues. The government has started to take steps to address structural gaps in the supply of finance to SMEs, and last year announced proposals to create a government-funded bank that will facilitate the provision of loans, including long-term capital, to SMEs through banks and other financial institutions.⁶² Qualifying limits for investment in small companies through venture capital trusts and enterprise investment schemes have also been recently relaxed through the Finance Act 2012.⁶³

The introduction of the EIS, SEIS and VCT relief schemes in April 2012 open up opportunities for early stage investment by offering tax benefits on investments in small unquoted companies.⁶⁴

In addition, earlier this year the London Stock Exchange launched the High Growth Segment, a new segment to the Main Market specifically for high growth trading companies which will allow admission to the Main Market with a lower required free float of 10 per cent (of the business) as compared to the 25 per cent required for a listing by UK companies and 50 per cent for non UK companies.⁶⁵ This opens up another platform to fast growing companies by giving them access to London’s public markets earlier in their development.

This report recommends:

- BIS, together with Her Majesty’s Treasury, encourages venture capital and bank lending to smaller technology businesses for example by facilitating loans to small and medium sized TMT businesses through the government-funded bank. Businesses should be encouraged to engage with venture capital where appropriate (e.g. Vodafone Ventures). Advanced markets like the United States and Canada may be studied for insight into how to enhance access to finance;
- the UK financial services industry examines options to sharpen the professional and analytic skills required to appraise investment opportunities in technology companies. An example of an innovator in this space is Silicon Valley Bank, which opened its first UK branch at the end of 2012; and
- the UK technology business community targets pensions funds for investment in technology, following the example of Canada, where pension funds have increasingly invested in emerging technology sectors; technology businesses should seek to explain their business models and income projections in a way that can demonstrate potential to investors looking for specific and long-term investments.

Community: Create a collaborative and community environment among London digital creative start-ups, businesses and universities, aiming to develop and achieve global ambitions.

London has made a series of positive moves:

- Organisations such as TechHub and Central Working, which provide co-working spaces and knowledge sharing events for members, are helping foster collaboration in the technology sector.

Canary Wharf Group's recently launched 'Level39' hosts a number of Fin-tech related accelerator programmes, demonstrating how business can support local hubs. From 2014, iCity in Hackney will provide co-working opportunities for businesses that require larger facilities and easy access to data centres, minutes from central London. BT is the first major business to take space at the former International Media Centre for the 2012 Games, where it will house its new BT Sport television services, around which it is hoped smaller tech businesses will cluster.

- the Mayor of London's recent launch of the Smart London board is a starting point for further development, alongside initiatives led by Tech City and the Open Data Institute. Experts including academics, business leaders and entrepreneurs should help to develop a 'Smart London' vision leveraging technological innovation.

To build on this environment this report recommends:

- The London business community, supported by business organisations, and the Mayor develop promotional events and conferences to foster collaboration and build on initiatives such as the Founders Forum. The business community and the Mayor of London should support projects that feed an entrepreneurial culture. They should consider organising conferences similar to Failcon in Silicon Valley, where entrepreneurs and venture capitalists share their stories. The failure event with Wikipedia founder Jimmy Wales during the Olympics is an example of this and should be built upon.
- The Mayor of London seeks to make London a world leading 'Smart City', developing a comprehensive definition and vision for 'Smart London' which encourages the business community to invest. This should take into account work being completed by the Technology Strategy Board and projects in other cities, like Boston's Office of New Urban Mechanics. The Mayor should also continue to advocate and provide support for global showcase projects like 'The Crystal' research centre, opened by Siemens in London's Royal Docks.

- London's business community continues to provide the environment and infrastructure to support development of local hubs, where possible, particularly those offering services relevant to their own expansion and growth. This support could encompass the provision of affordable space, shared procurement services, mentoring opportunities and sponsorship.
- Central government develops policies that enable London as a global digital hub as part of its broader growth strategy.

Connectivity: Ensure London is at the forefront of fast connectivity to underpin digital innovation.

Following the recent LTE (4G) auctions, mobile operators are expected to roll-out new services using existing and new spectrum holdings. It is intended that the majority of the UK will have access to these by the end of 2017.⁶⁶

The 4G spectrum provides faster broadband, increased throughput and better security, offering the potential for higher volumes and a wider range of mobile applications in areas such as interactive education, telemedicine, shopping, entertainment and recreation, all of which can make a significant contribution to UK economic growth.⁶⁷

The government's plan to fund super-fast fibre optic networks in select UK cities including London⁶⁸ is a helpful contribution, but more steps could be taken before full deployment of 4G to signal readiness to differentiate London on the global stage.

Interviews carried out for this study suggest the high number of local authorities in London is instrumental in delaying planning permissions for infrastructure projects. The Growth and Infrastructure Bill, which proposes to relax some planning restrictions to assist communications providers to deploy fibre infrastructure, is expected to help address these constraints.

In our SME survey, participants identify improving the IT infrastructure as a policy priority to help foster the London TMT sector.

To further develop the environment this report recommends:

- government and industry work together to provide super-fast broadband of 1GB in some London business and residential areas. Government should work with the communications industry to ensure London is always at the forefront of fast connectivity to underpin digital innovation; and
- the Mayor of London champions a London-wide strategy for connectivity across London. This would aim to simplify planning applications and encourage greater coordination of the 33 local authorities involved in London-wide infrastructure planning decisions.

General business environment and infrastructure: Maintain a favourable environment.

Alongside specific measures to support TMT, interviews carried out for this study stressed the sector is reliant on the wider business environment. Interviewees highlighted the following:

- the government must continue to balance the imperative for students and qualified individuals and their families to move to and engage in the UK growth economy with other considerations. This is key to attracting high calibre talent. The government has established an entrepreneur's visa, but the issue presents a potential ongoing challenge. An example of this is that the visa currently only allows for one company "Founder".
- the government has made positive steps towards ensuring the UK has a competitive personal tax scheme, and it is important the personal tax environment remains stable and predictable; and

“Reliability, capacity and speed of the IT infrastructure are critical to our ability to remain competitive for our clients.”

Director, professional services SME.

“What would push us out of the UK and London? Further worsening of the attitude towards immigration and business in general.”

Board Executive, UK global TMT business.

- the need for the government to accelerate its review of airport hub capacity in the South East, and articulate a vision for resolving this constraint, however provided. The plans for Crossrail in London will help connect elements of the London TMT cluster and Heathrow;

The ambition set out in this report is consistent with the objective of initiatives such as Open Innovation 2.0, which aims to promote a sustainable economy and society by developing widespread innovation literacy in Europe.⁶⁹ It postulates a new innovation model to create jobs and improve quality of life, based on principles of collaboration and co-created shared value, through focus on:

- driving effective collaboration between industry, governments, academia and end users/citizens, on the basis that this can drive improvements far beyond the scope of what any one entity can achieve on its own;
- stimulating entrepreneurship and creating incentives to innovate and experiment, including by developing co-creation platforms for young high expectation entrepreneurs, promoting successful innovators and entrepreneurs as heroes, and fostering a culture where honourable failure can be a badge of honour; and
- prioritising demand driven and intersectional innovation, on the basis that the most value from innovation comes from its adoption not simply its production, and involving the user in the innovation process.

As the authors point out, Open Innovation 2.0 is enabled by the collision of mega trends including digitization and mass collaboration.

Conclusion

London's status is not in question. But as the digital revolution sweeps the globe, the city must not hesitate to take advantage. That means building on past achievements and harnessing the potential provided by the city's infrastructure, cultural capital and financial resources.

The foundation for creating a digital dividend is the TMT sector, which already supports a significant proportion of UK GDP. The resources provided by TMT should be viewed as a catalyst for London as a global leading digital creative hub, and a critical driver of economic growth in the UK.

London is the natural engine for the UK's digital creative strategy, but the benefits of success will be felt across the United Kingdom including in other key hubs. However, work needs to be done, both to promote the business community's efforts and enable the resources which may catalyse growth.

As New York and other cities rush to encourage their own digital economies, the onus is on UK business leaders and policy makers to take action now. It is hoped that this report will provide a helpful contribution to enable them to do so.



Appendix A: SME survey

During autumn 2012, Deloitte hosted an online survey for SMEs to seek their views on the contribution of technology, media and telecommunications industries to the London and UK economy. The survey link was sent to London First's database of SMEs (drawn from a variety of sectors) and publicised to Deloitte's Technology Fast 50 on social media networks. More than 110 responses were received. This appendix presents the quantitative results from the survey. Selected quotes from the survey can be found in the main body of the report.

A.1 Survey respondent demographics

The first set of responses set out the demographics of respondents. Note the number of responses differs by question as not all respondents answered all questions.

1. Which sector of the economy does your organisation mainly operate in? Choose one only.

	Responses	%
Business and professional services	44	41%
Retail and other consumer businesses	2	2%
Energy & resources	1	1%
Financial services	0	0%
Healthcare and life sciences	0	0%
Technology, media and telecommunications	54	50%
Infrastructure and capital programmes	0	0%
Public sector	2	2%
Manufacturing	1	1%
Real estate	2	2%
Travel, hospitality and leisure	2	2%
Other	0	0%
	108	

Source: Deloitte survey

Unsurprisingly, given the targeting of the survey, half of respondents are drawn from the TMT sector, followed by business and professional services.

Of those firms in the TMT sector, the majority were involved in technology or media, with only 2 per cent classifying themselves as telecommunications businesses.

1a. What part of the TMT sector are you?

	Responses	%
Technology	29	54%
Media	24	44%
Telecommunications	1	2%
	54	

Source: Deloitte survey

The low number of telecommunications-only businesses is perhaps not surprising given the scale required to operate. As the table below shows, the majority of responses were from SMEs with 10 or fewer employees.

	Responses	%
1–10 employees	57	63%
11–49 employees	20	22%
50–199 employees	8	9%
200+ employees	5	6%
	90	

Source: Deloitte survey

The majority of respondents consider themselves to be domestic businesses, as per our definition.

2. Would you consider your business to be a domestic UK business, i.e. one that has not received foreign direct investment?

	Responses	%
Yes	100	91%
No	10	9%
	110	

Source: Deloitte survey

A.2 Survey results

The survey was broken down into a series of themes:

- the choice of London as a business destination
- TMT linkages across the economy.
- Policy challenges.

The following sections present each set of results.

A.2.a The choice of London as a business destination

Respondents were asked to rank the different factors that influenced their decision to locate their headquarters in London. A number of factors were cited as being important, led by transport links, followed by the TMT infrastructure, availability of a skilled labour force, proximity of consumers and presence of similar organisations – though it should be noted many entrepreneurs were already in London and did not need to be attracted (but instead retained).

The least important factors were government support and access to finance. This should be interpreted carefully. It does not suggest that SMEs do not see government support and access to finance as important (our research suggests they do), but rather the current levels of support and access to finance in London were not determining factors influencing the location of the business. If there were more support and better availability of finance, these reasons may become larger factors in attracting SMEs to London.

Other reasons cited for choosing London as a business destination include its reputation, the presence of the City of London, the socially different and eclectic culture of East London and that London is already a media hub.

3. Which factors attracted your organisation to base its headquarters in your current location? Rank each factor by importance, with 1 being the lowest and 5 the highest.

	1 = Least important	2	3	4	5 = Most important
IT and telecommunications infrastructure	15	3	23	26	24
Availability of skilled labour force	13	8	19	27	21
Proximity to consumers	15	8	19	27	21
Presence of similar organisations (industry clusters)	14	13	24	28	11
Government support	52	20	7	6	3
Access to finance	46	17	15	4	5
Cost of office space	22	18	20	14	14
Was already living here	19	5	15	20	33
Transport links	5	5	16	42	25
Vibrant media	15	13	14	26	20
Other, please specify below	9	0	4	2	6

Source: Deloitte survey

4. What are the key challenges of remaining in your current location? Tick all that apply and rank each factor by importance. (1 being the lowest and 5 the highest).

	1 = Lowest	2	3	4	5 = Highest
Inadequate transport infrastructure	40	20	10	9	8
Inadequate IT and telecommunications infrastructure	35	24	11	9	9
Shortage of skilled labour force	43	12	16	11	6
Unfavourable regulatory regime	39	17	16	11	4
Lack of Government support	34	17	9	15	14
Difficulties in access finance	32	19	11	9	17
Rising cost of office space/restrictive planning regime	12	12	18	28	21
London's air links	45	24	8	6	4
The tax regime	27	19	24	12	9
Other, please specify below	11	0	0	1	4

Source: Deloitte survey

As suggested above, some of the key challenges identified were lack of government support and difficulties in accessing finance. However, as the results show, there is a spread of opinion as to what the key challenges are, suggesting that across the SME population individual businesses face a range of challenges. There is perhaps no single 'silver bullet' to address their concerns.

Other challenges identified were the visa regime for non-EU workers, a fundamental misunderstanding of the creative industries by the government and difficulties in finding consumers. Some respondents also complained this made them less competitive and vulnerable to being undercut by non-UK based competitors.

5. Would you consider moving to a different location?

	Responses	%
Yes	27	31%
No	35	40%
Don't know	26	30%
	88	

Source: Deloitte survey

Around a third of respondents admitted that they would consider moving to a different location from London, with a further 30 per cent unsure.

For those considering moving, some of the reasons given were:

- lack of suitable or affordable premises to expand into
- insufficiently fast broadband connections
- to be better placed to serve international clients
- to take advantage of a more favourable tax regime
- other locations are more conducive to business
- to improve the quality of life of employees.

Locations such as the Netherlands, Germany, Brazil, Poland, the UAE, the United States and Switzerland were cited as alternatives to London.

For the 40 per cent of respondents who indicated they were not considering moving from London, the following reasons were given:

- proximity of London to clients, creative and financial industries
- a preference to open branches rather than relocated headquarters
- good transport links
- the cost of moving.

It is clear from the responses, that there are strong reasons for businesses to remain headquartered in London, but there is growing discontent and a number of rival locations are perceived as being more attractive/conducive to SMEs.

A.2.b TMT linkages across the economy

These questions first explore how TMT changes in the past decade have affected productivity and ways of working.

6. Has the use of new technology and telecommunication services and products improved the way your organisation does business compared to ten years ago?

	Responses	%
Substantial improvement [excess of 50%]	49	53%
Significant improvement [25–50%]	33	35%
Some improvement [10–25%]	8	9%
Modest improvement [0–10%]	2	2%
No improvement	1	1%
	93	

Source: Deloitte survey

Some 99 per cent of respondents agree that technology and telecommunication services have improved the way their organisation does business compared with ten years ago, with over half reporting a substantial improvement. This is not surprising when considering innovations in mobile technology and the Internet in the past ten years and how they facilitate new ways of working and reduce barriers to entry and expansion.

The next two questions focused on the use of media services and distribution channels impacting sales and publicity.

7. Has the use of media services and products generated greater publicity and awareness of your products and services, leading to increased sales compared to ten years ago?

	Responses	%
Substantial increase [excess of 50%]	20	22%
Significant increase [25–50%]	25	27%
Some increase [10–25%]	27	29%
Modest increase [0–10%]	10	11%
No increase	10	11%
	92	

Source: Deloitte survey

8. Has the use of new distribution channels and consumer interaction tools such as social networks led to increased sales compared to ten years ago?

	Responses	%
Substantial increase [excess of 50%]	16	17%
Significant increase [25–50%]	22	24%
Some increase [10–25%]	26	28%
Modest increase [0–10%]	11	12%
No increase	17	18%
	92	

Source: Deloitte survey

As with question 6, the majority of respondents agree that media services and products and new distribution channels have led to an increase in publicity and sales respectively – though perhaps not to the extent of technology and telecommunications developments over the past ten years.

A.2.c Policy challenges to London

The final set of questions sought respondents' views on what steps government and other organisations can take in promoting TMT in London.

Key policy areas identified by respondents included tax breaks, improving IT infrastructure and access to finance, though all policy suggestions received support with none being identified as unimportant. This reflects the multi-faceted nature of the policy challenge.

9. Thinking specifically about the Greater London area, what types of policies could be introduced to promote the Technology, Media and Telecommunications sector and enable other organisations to benefit from its application? Rank each factor by importance, with 1 being the lowest and 5 the highest.

	1 = Least important	2	3	4	5 = Most important
Improving the available skills base [i.e. through training or making it easier to recruit overseas talent]	3	6	16	11	8
Improving IT infrastructure [i.e. expanding network capacity]	0	4	10	17	13
Reducing red tape and regulations [e.g. around planning]	2	9	13	14	6
Providing access to finance	1	6	15	9	12
Subsidies in the form of tax breaks [e.g. for R&D]	0	1	8	15	20
Other, please specify below	2	0	0	0	7
	8	26	62	66	66

Source: Deloitte survey

Other policy suggestions include:

- faster implementation of already announced policies
- giving UKTI a specific mandate to help new businesses (many new businesses in this area are automatically global given the nature of their industry, but UKTI is felt to be overly focused on the 'physical economy')
- actively 'buying British'
- replacing the 3G network
- improving aviation links.

These suggestions are supported by respondents' answers to what they see as the biggest current barrier to London becoming a TMT hub; a lack of government support being the most important.

10. Thinking specifically about the Technology, Media and Telecommunications sector in the Greater London area, what are the biggest barriers to success currently? Rank each factor by importance, with 1 being the lowest and 5 the highest.

	1 = Least important	2	3	4	5 = Most important
Inadequate transport infrastructure	12	14	13	4	0
Inadequate IT infrastructure	9	9	11	7	7
Shortage of skilled labour force	8	9	11	9	5
Unfavourable regulatory regime	8	6	15	9	12
Lack of Government support	3	1	8	15	20
Difficulties in access finance	3	0	0	0	7
Other, please specify below	3	1	1	0	3
	46	40	59	44	54

Source: Deloitte survey

A.2.d. Other comments received

Respondents highlight the following issues with respect to London becoming a TMT hub.

- a labour force with relevant skills is necessary to increase competitiveness.
- government should not be afraid to ‘pick winners’.
- there is little support in setting up overseas subsidiaries.
- social media is important, but there is little evidence of it improving profits unless the product or service is targeted at the prime social network audience (the young, music and lifestyle products).
- the cost of hardware should not be ignored.
- large companies continue to dominate, making it hard for SMEs to compete and grow.
- public sector commissioning is not agile enough to include new SMEs.

Appendix B:

Stakeholder interview participants

Deloitte would like to thank the organisations that participated in our programme of interviews for the study:

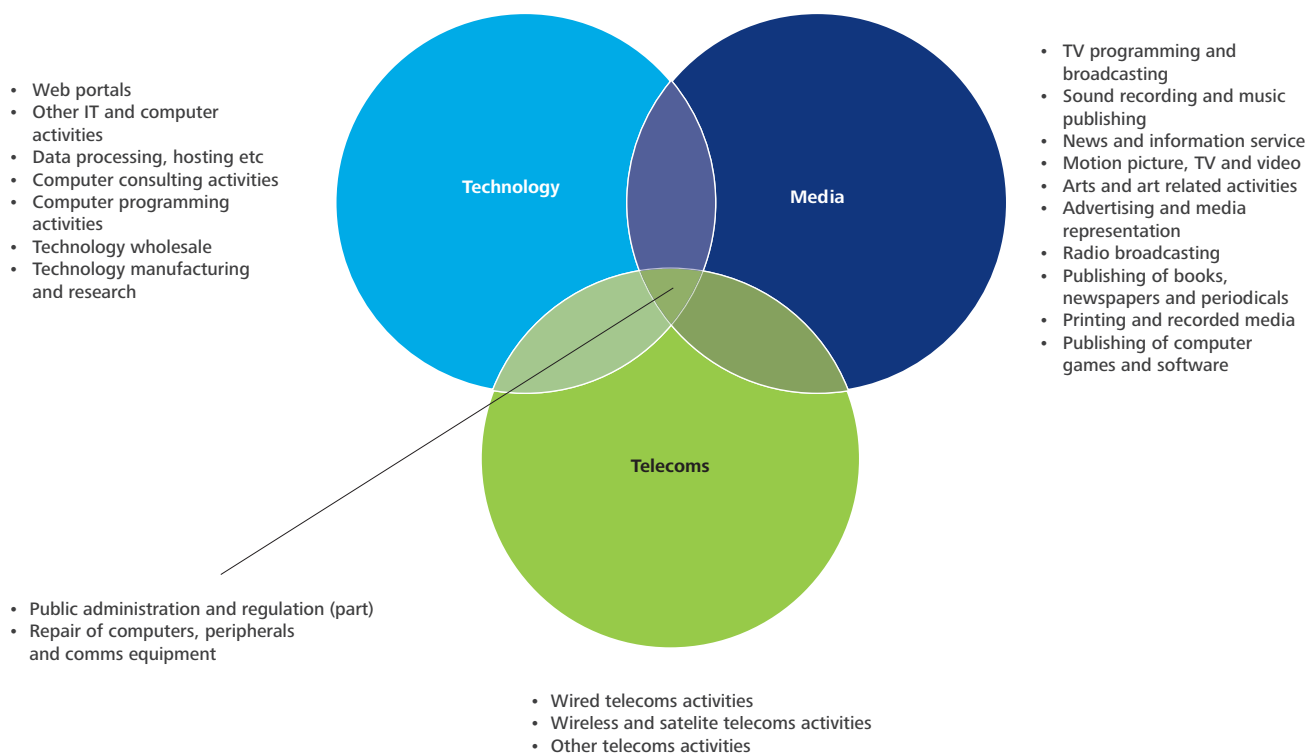
- Arqiva
- Associated News
- Avanta
- BBC
- BT plc
- BSkyB
- Central Working
- Cisco
- City University
- Derwent London
- Disney
- EMC
- EMI
- Enders
- Everything Everywhere
- Gensler
- Google
- Intel
- Intellect
- ITV
- King's College London
- London & Partners
- Logica CGI
- News Corporation
- Pearson
- PPL
- Reed Elsevier
- University College London
- Virgin Media
- Vodafone
- Workspace
- And the 110 organisations which participated in our SME survey.

Appendix C: Study methodology

1.1 Overview

TMT involves a number of sectors across the economy.⁷⁰

Figure 1.1. TMT sectors



This study quantifies the economic impact of the London TMT sector on the UK.⁷¹ These impacts include:

- Impacts from London TMT’s narrow footprint – including the direct impact of TMT organisations and knock-on spending effects across the economy.
- TMT’s broader impacts – which result from TMT organisations acting as enablers of economic activity in the sectors across the economy that source and leverage TMT.

The economic impacts from the London TMT sector’s physical footprint are created from:

- The profits, wages paid and taxes of TMT organisations located in London (direct impacts).
- Their purchases of intermediate inputs from suppliers along the respective value chains, such as the independent production sector in the case of broadcasters (indirect impacts).
- Knock-on economic effects as direct and indirect effects flow through the economy and generate consumer spending by those earning wage income (induced impacts).

Broader impacts considered in this report include the role of TMT in enabling a knowledge-based and more productive economy through the media sector and Information and Communications Technology (ICT).

The types of impact are considered in the impact framework shown in Figure 1.2.

As the diagram shows, the effects include impacts from the London TMT sector's narrow footprint (1–3) and catalyst effects in London (4), as well as resulting impacts in the rest of the UK (5–7).

The modeling analysis excludes activity from TMT organizations located in the rest of the UK. Results presented for the rest of the UK, therefore, represent jobs and output that may be traced back to TMT activity in London in isolation.

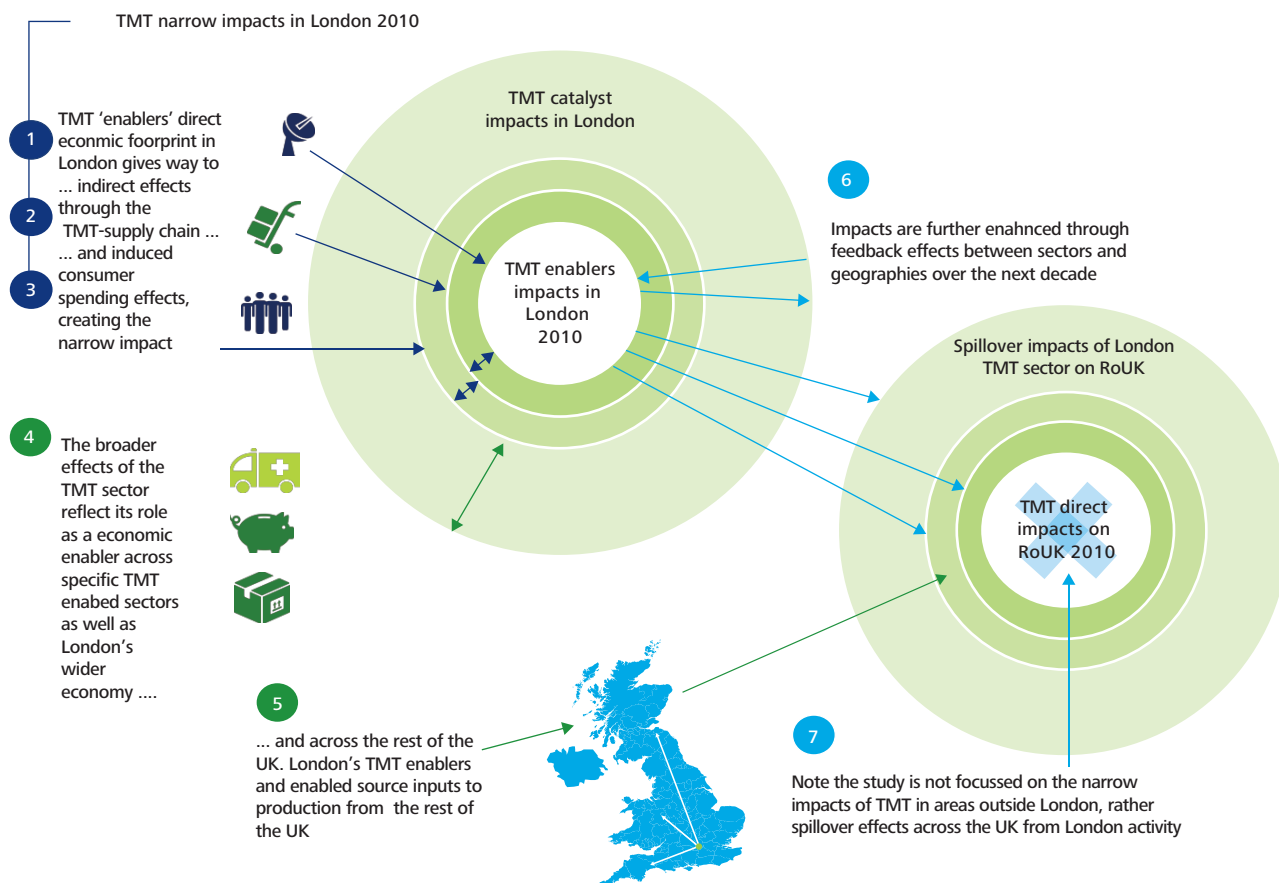
1.2 Qualitative research

As well as providing a quantification of the extent to which TMT contributes to the London and UK economy, the study contains a qualitative research element with major TMT organisations and SMEs.⁷² This research has provided context and informed policy areas that may enable a global TMT hub in London.

These consultations were structured around a series of themes including:

- the reasons why TMT businesses locate in London
- the challenges of London for TMT businesses
- the types of impacts that the London TMT sector has on the economy, both across UK regions and the range of sectors in the economy
- the key priorities to be addressed for London to become a recognised global TMT hub.

Figure 1.2. TMT impact framework



Source: Deloitte analysis

Interviews

Over 30 interviews were conducted face-to-face by Deloitte and London First as part of the study. The organisations were mostly large corporates and multinationals, with many, though not all, in the TMT sector.

Survey

A short web-based survey run by Deloitte was published, with invites sent to more than 3,500 organisations. These organisations represented a cross-section of the economy, rather than just TMT, and the focus was around all types of enterprise size rather than the larger organisations favoured in the consultation phase.

Invitations to participate were based around contact details made available by London First's membership database and Deloitte's database.

The survey achieved over 110 responses, a response rate of around 3 per cent. The survey was not designed to be statistically significant, with no specific sampling methodology used.

A detailed description of the survey results is in Appendix A. The list of participants in our interviews is in Appendix B.

Appendix D: Narrow GVA and employment analysis

2.1 Method overview

The objective of the narrow footprint analysis is to demonstrate the extent to which TMT is represented directly in London, and the way in which TMT supports other activities in London and across the UK.

The model used in this analysis is a simplification of the London and UK economies, which links the way in which sectors buy from each other and employ and pay for labour, and how employees spend their income.⁷³

The television sector, for example, generates employment and GVA in its own right, but also creates significant benefits through the supply chain and the wages it pays staff. The first order supply chain in turn benefits suppliers, and employee spending benefits retailers and the like. These effects continue throughout the economy, both inside and outside London.

Data from the ONS regarding the level of employment in 4-digit Standard Industrial Classification sectors is sourced to give an estimate of the extent of TMT enabler sector contribution in London. This gives an aggregated total of all jobs in TMT organisations across London. This 'direct impact' is then fed through the model to determine the impact through the supply chain and consumer spending.

The methodology for regionalisation includes the use of mathematical and economic techniques to approximate appropriate regional economies in model form from the UK Domestic Use Matrix by approximating:

- Who might be expected to buy what from whom (business to business purchases).
- Who might be expected to pay whom for their work (compensation of employees).
- Who might be expected to buy what from whom (consumption of goods and services).

The method is based around academic research into the approximation of sub-national multipliers which has been tested where comparable sub-national matrices are available. The specific adjustments made to national level coefficients include:

- Location quotients to control for industry scale relative to national level.
- Cross-location quotients to control for the abundance of 2 sectors relative to each other with an area.
- A decay function to control for the risk of overestimation of local multipliers.



Appendix E:

Import propensity and additionality estimates

To derive the share of ICT Value Added contribution attributable to London the study draws on import propensities of each sector, calculated using the ONS Domestic Use Matrix 2005, London's share of UK TMT sector employment (28 per cent), and EU KLEMS data.

The resulting share of London to total contribution is between approximately 25 per cent in sectors such as banking, finance and railway transport and approximately 10 per cent in sectors such as refined petroleum and nuclear fuel. They are presented below. The London share of ICT is multiplied by London GVA to obtain direct GVA of each sector of the economy supported by London ICT.

Industry	Import propensity (% intermediate demand)	Additionality ⁷⁴ (%)
Coke ovens, refined petrolrum and nuclear fuel	72%	8%
Electronic components	64%	10%
Rubber products	61%	11%
Fertilisers, plastics and synthetic resins etc, pesticides	55%	12%
Other chemical prodcuts, man-made fibres	55%	12%
Oils and fats processing	55%	12%
Receivers for TV and radio	52%	13%
Paper and paperboard products	52%	13%
Aircraft and spacecraft	50%	14%
Motor vehicles	49%	14%
Electrical equipment nec	47%	15%
Wood and wood products	47%	15%
Iron and steel, non-ferrous metals, metal castings	45%	15%
Pharmaceuticals	43%	16%
Paints, varnishes, printing ink etc	42%	16%
Leather goods, footwear	42%	16%
Special purpose machinery	40%	17%
Pulp, paper and paperboard	39%	17%
Sugar	37%	17%
Inorganic chemicals, organic chemicals	37%	18%
Other metal products	36%	18%
Electric motors and generators etc insulated wire and cable	36%	18%
Water transport	35%	18%
Cutlery, tools etc	35%	18%
Miscellaneous manufacturing nec, recycling	35%	18%
Industrial gases and dyes	35%	18%
Plastic products	34%	18%
Research and development	33%	18%
Air transport	33%	18%
Office machinery and computers	33%	19%
Textile fibres, textile weaving, textile finishing	33%	19%
Made-up textiles, carpets and rugs, other textiles, knitted goods	31%	19%
Mechanical power equipment	31%	19%
Telecommunications	31%	19%
Other service activities	30%	19%
Metal forging, pressing etc	29%	20%
Other transport equipment	28%	20%

Industry	Import propensity (% intermediate demand)	Additionality (%)
Metal boilers and radiators	28%	20%
Ceramic goods	28%	20%
Medical and precision instruments	27%	20%
Machine tools	27%	20%
Motor vehicle distribution and repair, fuel	26%	20%
Glass and glass products	25%	21%
Computer services	24%	21%
Advertising	22%	21%
Tobacco products	22%	22%
Structural clay products, cement, lime and plaster	21%	22%
Weapons and ammunition	20%	23%
Households	20%	23%
Hotels, catering, pubs etc	19%	22%
Furniture	19%	22%
Animal feed	19%	22%
Oil and gas extraction	19%	22%
Waering apparel and fur products	18%	23%
Transmitters for TV, radio and phone	18%	23%
Soap and toilet preparations	18%	23%
Recreational services	18%	23%
Jewellery and related products	18%	23%
Articles of concrete, stone etc	18%	23%
Other food products	18%	23%
Alcoholic beverages	17%	23%
Total intermediate demand	17%	21%
Ship building and repair	16%	23%
Fishing	16%	23%
Other business services	16%	23%
Metal ore extraction, other mining and quarrying	15%	23%
General purpose machinery	15%	23%
Agricultural machinery	14%	24%
Coal extraction	13%	24%
Auxilliary financial services	13%	24%
Domestic appliances nec	13%	24%
Grain milling and starch	13%	24%
Wholesale distribution	12%	24%
Confectionery	11%	24%
Printing and publishing	11%	25%
Accountancy services	11%	25%
Public administration and defence	10%	25%
Letting of dwellings	10%	25%
Structural metal products	9%	25%
Postal and courier services	9%	25%
Retail distribution	9%	25%
Social work activities	8%	25%

Industry	Import propensity (% intermediate demand)	Additionality (%)
Electricity production and distribution	8%	25%
Sports goods and toys	8%	26%
Health and veterinary services	7%	26%
Agriculture	6%	26%
Banking and finance	6%	26%
Meat processing	5%	26%
Other land transport	4%	26%
Fish and fruit processing	4%	26%
Education	4%	26%
Bread, biscuits etc	4%	26%
Architectural activities and technical consultancy	4%	27%
Soft drinks and mineral waters	4%	27%
Ancillary transport services	4%	27%
Legal activities	4%	27%
Renting of machinery etc	3%	27%
Market research, management consultancy	3%	27%
Insurance and pension funds	3%	27%
Membership organisations nec	3%	27%
Sewage and sanitary services	3%	27%
Owning and dealing in real estate	3%	27%
Construction	3%	27%
Forestry	3%	27%
Water supply	3%	27%
Estate agent activities	2%	27%
Dairy products	2%	27%
Railway transport	1%	27%
Gas distribution	1%	27%

Source: Deloitte estimates; ONS Domestic Use Matrix 2005

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 - provision of specialised telecommunications applications, such as satellite tracking, communications telemetry, and radar station operations
 - operation of satellite terminal stations and associated facilities operationally connected with one or more terrestrial communications systems and capable of transmitting telecommunications to or receiving telecommunications from satellite systems
 - provision of Internet access over networks between the client and the ISP not owned or controlled by the ISP, such as dial-up Internet access etc.
 - provision of telephone and Internet access in facilities open to the public
 - provision of telecommunications services over existing telecom connections:
 - VOIP (Voice Over Internet Protocol) provision
 - telecommunications resellers (i.e. purchasing and reselling network capacity without providing additional services).This class excludes:
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70. The narrow definition of the TMT sector includes 55 4-digit 2007 Standard Industrial Classification (SIC) Sectors. The full list of these sectors are included Annex A.
71. For statistical and economic analysis, London is defined for this study as the 33 boroughs constituting Greater London. The broader policy conclusions refer more broadly to the London area which encompasses interrelated areas in London's environs such as the M4 Corridor and Reading.
72. London First also ran a major conference with WIRED Consulting to discuss the TMT issues impacting the future of London. The event was attended by over 300 delegates and featured 42 speakers from across the business sectors. A breakfast debate was also held with a number of SMEs at Avanta's Media Village.
73. The input-output model used for the analysis of the indirect and induced effects created from TMT sectors, is based upon ONS' latest Domestic Use Matrix (DUM), which contains information regarding all transactions in the UK economy between sectors and consumers. This is augmented with information regarding employment and per worker productivity from BRES and other ONS Supply-Use tables respectively. To obtain indirect and induced effects for London and the rest of the UK, a method was employed which approximates the London economy on the basis of how the economy differs from the UK as a whole.
Adjustments are made to reflect the industrial structure of London, both internally and relative to the UK to arrive at multipliers which reflect the likely propensity for London businesses to source from London, from elsewhere in the UK and from overseas.
Employment Location Quotients are used to give a measure of London's specialism relative to the UK as a whole and Cross Location Quotients (between sectors of the economy in London and relative to the UK) are used to reduce national level multipliers where there are lower levels of activity in supplying sectors. As an example, if the food manufacturing sector in London sources predominantly from agricultural sectors, and they are not located in London, the multiplier is reduced accordingly. Finally a generic decay function is applied across all sectors of the economy to reflect the fact that in off-model tests, regional model approximations tended to overstate multipliers.
74. Additionality estimates are the estimated share of London in total contributions for this analysis.

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