A GLOBAL TELECOMS INNOVATION HUB:

Why the UK is the definitive R&D destination

UKTIN

INTRODUCTION

There is a global imperative to innovate in telecoms. It is the digital backbone of civilization, ready to support the world in tackling the economic and societal challenges of today.

These range from the drive toward net zero to increasing economic productivity with finite resources – from supporting aging populations to leaving no person behind when it comes to the benefits of digitalization. These issues look different on the ground but unite us all globally – and connectivity is the catalyst for change.

However, the telecoms sector finds itself at an inflection point. The rate of technological advancement is outstripping the capacity to deliver benefits to the public.

Greater affordability and feasibility of non-terrestrial networking, developments in open networks, and the race towards the 6G era can all create new opportunities and new entrants to the market.

But at the same time, challenging macroeconomic conditions, skills shortages and sector fragmentation have negatively impacted deployment. Leaps forward can often be restricted to isolated silos at an individual country level.

As such, we want to avoid a missed opportunity for joined-up thinking and collaboration between nations. Telecoms is a global sector – for it to flourish and succeed players must build partnerships to drive new growth, attract new customers, and bring value for stakeholders, shareholders, and wider society. We need to realize the potential of telecoms, and that means working together.

Through international collaboration, the telecoms sector can scale and share the fruits borne from innovation globally.

The UK is perfectly placed to support this challenge. With our strengths in **industry**, **academia**, and **entrepreneurship**, the country is an attractive location for international partners to drive forward innovation in the sector.

It is through cross-boundary collaboration that countries can access the expertise, skills, and resources to solve the current challenges facing the sector and unlock new growth opportunities – for the mutual benefit of the sector and the UK. More so, we are open and ready to accommodate such partnerships.

In this paper, we will set out the UK's strengths and future opportunities for global telcos, including its appeal as an R&D destination and regional investment proposition.

We will examine how a new model for international telecoms innovation is enabled by the UK, through the UK Telecoms Innovation Network (UKTIN).

And because no single problem is the same for different markets, we will explore a detailed country breakdown, including the country context, the investment opportunity, and why the UK aligns as a partner.

Why the UK is the perfect international innovation partner for telecoms

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In this section, we will cover what makes the UK an attractive proposition for international inward investment focusing on four areas.

The UK's rich heritage in bringing new technologies and ideas to life

Radio telecommunications is written into the country's DNA. In May 1897, the first wireless communication across the open sea was sent four miles across the Bristol Channel, with the message: "Are you ready?". The inventor at the heart of this technological milestone was Italian Guglielmo Marconi. After applying for funding in his home country and receiving no response he went on to establish The Wireless Telegraph & Signal Company in the UK.

Just four years after this cross-water transmission in southwestern England, the first transatlantic wireless communication was sent from the UK to St. Johns in Canada.

There's much to learn from Marconi's story today. He was a visionary and entrepreneur who came to the UK to bring his ideas to life, and in the process signaled a new dawn for technology.

That spirit of collaboration lives on. In more modern times, it was the work between UK researchers and other nations that gave rise to the modern internet in the 1990s.

Today, the UK has multiple regional clusters of expertise, with strong capabilities in AI, cybersecurity, software, virtualization, system integration, testing, space and satellite communications, photonics, and semiconductors.

A location fit for international collaboration

The UK is rated as one of the best countries in the world for starting a business – ranking eighth on the World Bank's Ease of Doing Business Index.

Furthermore, the PWC Global CEO Survey places the UK as the fourth most favored investment destination.

Positioned between global time zones and only a short distance from the European continent, the UK is an attractive location as a global hub for collaboration.

The UK is already home to the global headquarters of several major players in the sector including Vodafone, BT, and Arm. The country is also recognized internationally as a base for innovation - for example, Ericsson announced a 6G research unit will be set up in the UK as part of a ten-year investment.

The UK government is also demonstrating international leadership on telecoms policy issues, for example recently by joining forces with Australia, Canada, Japan, and the United States to launch the Global Coalition on Telecoms (GCOT).

This new informal coalition will explore opportunities for closer global coordination in areas such as research and development, information sharing, and international outreach. Through these initiatives, the coalition seeks to advance several shared objectives which include promoting growth opportunities for industry and enabling dialogue between policymakers, business, and academia.

Furthermore, the UK has re-joined the Horizon Europe scheme, giving UK scientists access to the world's largest research collaboration program.

Home to world-beating talent and academia

The UK has 90 world-class universities with four in the global top ten: Oxford, Cambridge, Imperial College London, and UCL.

As well as the institutions, the quality of UK academic research ranks as best in the G7 and all other comparator countries and has done every year since 2007.

The quality of academia and talent in the UK makes it an attractive offer for international telecom partners wanting to further research and develop new propositions.

There are also clear examples of industry and academia coming together to push forward innovation in the sector. For instance, York University is home to the interdisciplinary Centre for High Altitude Platform Applications - working closely with industry players to pioneer new technologies for wireless communications in non-terrestrial networking.

Elsewhere, The University of Surrey, King's College London, and the University of Bristol which were part of the UK's first end-to-end 5G network in early 2018, as part of the 5GUK Test Network.

There is clear government support for telecoms

The UK government has a strong track record in providing support and investment for the sector.

This includes a £5bn investment from the UK government as it aims to make gigabit broadband available to 85% of the UK by 2025 and to more than 99% of the population by 2030.

In 2022, the country hit a key milestone by giving the majority of the population access to a 5G signal five years ahead of schedule. This was through the deployment of non-standalone 5G using existing 4G networks to deliver increased network capacity.

The £200 million 5G Testbeds and Trials Programme (5GTT) invested in a wide range of projects across the country. This included the Liverpool 5G project which created the second largest 5G mmWave mesh network in the world, providing an affordable private network to test new health applications.

The program explored 140 5G use cases accelerating 5G adoption in targeted sectors (including agriculture, utilities, automotive, transport and logistics). An interim evaluation of 5GTT found the program helped accelerate industry investment, resulting in £262.8m in further private and public investment. For every £1 of government investment, the program leveraged £1.65 in further funding.

Furthermore, the UK Wireless Infrastructure Strategy published in April 2023 sets out targets to deliver nationwide coverage of standalone 5G and increase coverage to 95% of the population by 2030.

There are also commitments in place to accelerate research on 6G following a £110 million investment. This includes three UK universities (University of York, University of Bristol, and University of Surrey) which were awarded £28 million in funding to develop 6G technology. An £80 million fund was also created for a new UK Telecoms Lab in the West Midlands to test network equipment. The research facility will test innovative new ways of boosting the security, resilience, and performance of the UK's mobile network, bringing together telecom operators, suppliers, and academics.

To stimulate further innovation, the Future Telecommunications Challenge aims to drive advancements in telecommunication technologies including 6G. The competition is a Small Business Research Initiative (SBRI) funded by the Department for Science, Innovation and Technology (DSIT) through Innovate UK.

Looking forward, the UK Government has made significant investment commitments with the ambition to establish the country as a 'science and technology superpower'. In 2023 alone:

- £36m of funding was allocated to establish 10 '5G Innovation Regions'.
- Around £3.5bn in funding was announced to support research into AI, supercomputing and quantum computing.
- The UK Space Agency committed £50m to funding new innovative projects in satellite communications which could enable the likes of driverless haulage, and space-based networks.
- Innovate UK - the UK's national innovation agency - launched a £100m fund to enhance productivity and efficiency through AI supporting high-growth potential sectors including agriculture, construction, transportation, and the creative industries.

KEY TAKEAWAY

The UK's geographic position, telecoms heritage, and level of government investment in the sector, position the country as an attractive destination for inward investment and innovation.

A new model for international collaboration – supported by UKTIN

UKTIN

The UK Telecoms Innovation Network (UKTIN) is the innovation network for the UK telecoms sector bringing together industry, government stakeholders, and academia to catalyze R&D investment, cooperation, and commercialization.

The network acts as a front door for international telecoms partners to access skills and expertise within the UK.

A range of services, developed in consultation with the sector, are designed to overcome fragmentation within the industry so that suppliers have a smoother path to innovate and grow.

UKTIN convenes expertise from across the whole telecoms ecosystem and, for the first time, provides a comprehensive map of academic and technical capabilities throughout the UK. This creates the opportunity to match skills with demand at both a UK and international level.

Brought together, new opportunities can be identified to support telecoms innovation at a global level, allowing UKTIN to signpost organizations to other bodies or individuals with expertise in emerging technologies.

The network offers a dedicated service helping international organizations navigate a smoother path to entering the UK. The UKTIN International Advisory Support Service includes guidance on compliance and standards requirements, facilitating access to testbeds, and signposting to relevant organizations, universities, and individuals.

KEY TAKEAWAY

The collective experience of those engaged in UKTIN presents opportunities for global companies to speed up innovation.

Exploring the investment opportunity by country

In this section, we will explore the opportunity for innovation and collaboration across three different international markets.

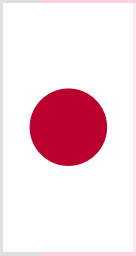
Each has its strengths and weaknesses, as well as opportunities and challenges. These are shaped by economic, cultural, and policy factors which can contribute to the pace of innovation at a local level.

We set out the opportunity for inward investment by aligning this context with how the UK can support innovation. We have explored the key markets of the United States, Japan, and South Korea, which could each benefit from closer collaboration with the UK.

Below are the government agreements and collaborations already in place:

United States

The Atlantic Declaration sets out to develop and deliver a shared work plan on critical and emerging technologies. Member of the Global Coalition on Telecoms (GCOT).



Japan

Agreement to cooperate on global telecoms supply chain issues including R&D collaboration on Open RAN and 6G. Member of the Global Coalition on Telecoms (GCOT).

South Korea

Jointly funded collaboration to solve power efficiency challenges in the rollout of more innovative and secure networks.

Now we will explore each country in more detail.

UNITED STATES

The context

The Atlantic Declaration, signed by President Joe Biden and Prime Minister Rishi Sunak in June 2023, was a further step forward in the continued US-UK economic partnership. The agreement includes a shared working plan on critical and emerging technologies such as AI and quantum technologies and, crucially, paves the way for US telecoms companies to further strengthen their collaborations with the UK. The US is also a member of the Global Coalition on Telecoms (GCOT), alongside the UK.

The opportunity for Investment

The United States and the UK have long shared common goals for telecoms with similarly mature markets and a history of successful joint working. This recent agreement solidifies that partnership with a unified vision for the future of telecoms, including initiatives such as 6G. As such, it sets a clear framework for the wider discussions around future collaborative opportunities.

The most fruitful of these is perhaps access to the UK's thriving academic scene, which is rich with world-leading early-stage R&D initiatives and ripe for investment. More specifically, the UK-US collaborative future could include:

- Closer R&D partnerships, with the potential for joint-funded competitions and projects where UK and US researchers work together and towards a common goal.
- The joining up of existing US and UK initiatives, such as testing facilities that are publicly funded on both sides of the Atlantic.
- Working together to shape global telecom standards now and in the future.

The strengths of the UK as a destination

In delivering on these opportunities, the UK offers a vibrant and active telecoms market for US firms to tap into. It is an emerging and increasingly rich playground for US telecoms and a growing investment opportunity:

- The two markets have natural synergies based around a common language, telecoms maturity and customer challenges – making them ideal telecoms companions.
- The UK is already widely known for its broad R&D capabilities – and this is especially true for telecoms, where the UK has deep specialist expertise. In particular, the UK's academic excellence makes it a unique destination for those active in R&D.

KEY TAKEAWAY

Sharing common goals for the future of telecoms as well as a deepening partnership in the Atlantic Declaration creates an opportunity for US telecoms companies to tap into the UK's world-leading academics.

JAPAN

The context

The UK has long been a second home for some of Japan's largest telecoms companies – including NEC Corporation, Fujitsu and Rakuten. With some four decades of established operations in the UK, 2022 saw Fujitsu cement the UK as a key region in its global innovation network when it announced an initial investment of £22 million as the first phase in establishing its Centre for Cognitive and Advanced Technologies.

The success of these companies' operations demonstrates the strength of existing collaborations between Japan and the UK – but with the UK continuing to invest in its telecoms capabilities and ecosystem, that opportunity is set to grow.

These opportunities will be based on and, in part, enabled by a strong political and economic alliance – as illustrated by Japan's active support of Britain's accession to the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) in July 2023. Japan formally led the UK's accession process inside the CPTPP and heralded its completion as a "big win." Japan is also a member of the Global Coalition on Telecoms (GCOT), alongside the UK.

The opportunity for Investment

For Japanese companies operating in the UK – or those looking to establish operations for the first time – the UK offers a long-term, future-proofed opportunity. Not only does the UK have a strong vision for telecom innovation but it is also providing financial support and a commitment to greater diversification. That support includes significant investment into Open RAN, paving the way for companies to tackle its unique commercial considerations, which differ from traditional deployments.

Toshiba for example has recently opened its Quantum Technology Centre in Cambridge, representing a £20 million investment in developing commercial quantum-secure communications technologies.

While the UK's market size is not as large as other countries, it provides a fantastic 'shop window' to highlight work. Japanese-owned companies with operations in the UK report that showcasing their work in the UK has enabled them to promote their technologies more readily to the rest of the world and attract further investment.

The strengths of the UK as a destination

- Extensive government backing and ongoing investment will, ultimately, advance the speed at which the sector can deliver innovation that will drive efficiency and commercial profit.
- All this is set to make the UK an even stronger and more attractive destination. Japan's telecom companies will begin to see even greater benefits from housing operations in the UK over the next five to 10 years.

KEY TAKEAWAY

The UK is a long-term and future-proof investment option for Japanese companies, particularly those with existing ties to the country. The UK offers a 'shop window' to showcase new offerings.

SOUTH KOREA

The context

South Korea and the UK have an established history of fruitful collaborations in telecoms. A prime example is Flexi-DAS, a collaboration between the two countries on Open RAN R&D to improve the power efficiency of 5G Open RAN systems.

Among its various technology focal points, the project is developing highly flexible Distributed Antenna System (DAS) radio heads/units based on field-programmable flexible radio chipsets and Radio Frequency Identification cards.

The opportunity

The Flexi-DAS project is a landmark for UK and South Korean joint working and demonstrates the potential for collaborative R&D in tackling some of the biggest challenges facing the global telecoms market.

Samsung's close partnership with Vodafone is another example of this collaborative spirit between two commercial organizations. The companies are working together on the rollout of Open RAN across 2,500 mobile sites in Wales and southwestern England.

While South Korea has been at the forefront of 5G innovation, one area ripe for collaboration is the increasing convergence of 5G and 6G with space and satellite technology – a sector where the UK is playing an active and leading role.

In 2022, the UK Space Agency invited applications from UK companies looking to develop technologies, products, and services in 5G telecommunications under the European Space Agency's "Space for 5G and 6G" program. The initiative seeks to integrate satellite technologies into communications networks to accelerate the rollout, reach, and impact of 5G.

This presents a clear investment opportunity - with the UK committed to accelerating the advancement of non-terrestrial networking.

For South Korean companies looking to capitalize on the next wave of innovation in 5G and 6G, and expand their operations or their investment in R&D, the UK offers an attractive and welcoming market.

The strengths of the UK as a destination

The UK and South Korea share common interests in emerging technologies, such as 6G. South Korea recently announced the K-Network 2030 strategy which aims to boost private-public cooperation to develop future 6G technologies. Meanwhile, the UK Government is investing up to £100m in a new future telecoms mission, which includes its 6G strategy.

South Korea and the UK are also investing heavily in AI. Korea Telecom is investing US$5.4bn in AI service R&D over the next five years and is targeting annual AI-driven services revenues of at least US$773m by 2025. In the UK, Innovate UK has unveiled BridgeAI, which aims to drive growth and competitiveness in the UK economy through the adoption of AI and ML, backed by a £100m investment.

The UK is particularly strong when it comes to the practical application of technical skills, with a strong focus on innovation in a commercial sense. It provides a strong basis to trial, deploy, and develop commercial models. The UK also has an embedded culture of creativity that shines through in its approach to innovation which South Korean firms can tap into through partnerships.

KEY TAKEAWAY

Examples of joint working at a government level underline the potential for future opportunities, including the development of 6G and non-terrestrial technologies.

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Turning opportunities into reality with UKTIN

UKTIN

The UK is a welcoming environment with an open door to international firms looking to operate or collaborate within its ecosystem. In this paper we've explored the investment opportunities in the UK for different markets, but how can these be brought to fruition?

Acting as a front door to the UK's telecoms ecosystem, UKTIN plays the role of conduit to connect people, programs, and projects with the relevant skills and expertise. It is this growing network of people that drives new concepts and innovation through disruptive ideas.

UKTIN has brought the UK's telecoms ecosystem together into a dedicated innovation network to provide international telecom firms with access to exceptional guidance, advice, and support, unlike anything else in the world.

The UK is already widely known for its broad R&D capabilities, and this is especially true for telecoms, where the UK has deep specialist expertise.

In particular, the UK's academic excellence makes it a unique destination for those active in R&D, as well as providing a full pipeline of excellent engineering talent for organizations to leverage.

Overseas firms must understand the nuances of the UK market and how to access the capabilities available across the ecosystem. UKTIN is forging connections with the many players in this space in one neutral environment and offers personalized support and advice. The network creates an open door into the UK, helping international firms navigate the challenges of entering the market.

Whether looking to invest or collaborate on R&D, they'll be able to discover new ideas and concepts, how to accelerate innovation, the skills needed, funding routes available, and how to match resources.

UKTIN is here to help international organizations navigate opportunities within the UK's telecoms sector, connecting companies with the right people to speed up innovation.

To find out more visit our website uktin.net

UKTIN