GSMA
Foundry

Mobile Innovation Report 2024

About the GSMA

The GSMA is a global organisation unifying the mobile ecosystem to discover, develop and deliver innovation foundational to positive business environments and societal change. Our vision is to unlock the full power of connectivity so that people, industry, and society thrive.

Representing mobile operators and organisations across the mobile ecosystem and adjacent industries, the GSMA delivers for its members across three broad pillars: Connectivity for Good, Industry Services and Solutions, and Outreach. This activity includes advancing policy, tackling today's biggest societal challenges, underpinning the technology and interoperability that make mobile work, and providing the world's largest platform to convene the mobile ecosystem at the MWC and M360 series of events.

We invite you to find out more at gsma.com.

About the GSMA Foundry

The GSMA Foundry is the go-to place for cross-industry collaboration and making positive change happen, supported by leading technology organisations and companies. By bringing together members and key industry players, engaging, and unifying the end-to-end connectivity ecosystem, the GSMA is solving real-world industry challenges.

Find out more and get involved at
https://www.gsma.com/foundry

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01. FOREWORD

Over the past 30 years, mobile connectivity has transformed the way we work and live. That transformation continues thanks to the rollout of highly versatile 5G networks, which can do so much more than their predecessors.

In fact, 5G is helping to realise all sorts of exciting futuristic concepts, from autonomous robots to holographic telepresence and virtual tourism. As science fiction becomes science fact, the GSMA Foundry is playing a pivotal role by facilitating the innovation behind many of these technological advances.

We launched the Foundry in 2021 to connect innovative thinkers with the global mobile ecosystem. It hit the ground running. In its short history, the Foundry has already enabled scores of promising ideas, concepts, prototypes and solutions to tap the expertise and the contacts they need to begin changing the world. It is a unique forum where organisations of all sizes can come together to pioneer new approaches and make lasting contributions to the industry.

At a time when telecoms operators' R&D spending continues to decline, the Foundry is playing a vital role in helping the industry to harness new ideas and innovations. It also provides the global visibility operators and their partners need to avoid duplicating R&D work being done elsewhere.

Crucially, the Foundry is both open and inclusive, working with all categories of GSMA members. It also has a can-do attitude. That philosophy makes it the go-to place for cross industry collaboration.

The Foundry is removing much of the friction at the interface between different industries and between large businesses and nimble entrepreneurs. In this way, it has quickly become key to the GSMA's efforts to stimulate 5G innovation and catalyse new growth for the mobile industry.

That growth will continue through this decade. By 2030, there will be more than five billion 5G connections worldwide, while the number of licensed IoT connections will more than double to 5.3 billion in the same timeframe, according to the GSMA's Mobile Economy report.

Now established as the 'Home of Mobile Innovation,' the Foundry is helping the GSMA fulfil its overarching mission to connect everyone and everything to a better future. As this innovation report shows, the GSMA Foundry is all about solving the most pressing challenges of our era, from climate change and energy conservation to economic growth and inequalities.

I am both proud of what the Foundry has already achieved and excited to see what it will do in 2024.

Alex Sinclair - Chief Technology Officer, GSMA

02. INTRODUCTION

Ideas are like plants. To grow and flourish, they need the right environment. At the GSMA Foundry, we are creating that environment. We look for projects geared towards the mobile sector and nurture them, whether they are seeds, saplings or fully-grown trees. The Foundry is supporting brand-new concepts, commercial trials, and even proven solutions that need to be scaled to a regional or global level.

Our goal is to match innovations with the right people. We aim to bring a willing coalition together who are keen to share learnings openly and take an agile approach to quickly formulate and create ideas that can be showcased to the industry.

As a result, mobile operators and innovators that join the Foundry get access to a wide pool of expertise, brand exposure and influential contacts who can help them address whatever obstacles stand in their way. We are a springboard that can help new products and services reach a global market of five billion mobile consumer and enterprise customers.

The Foundry is also a great place for investors to find new opportunities, whether that be in companies at the forefront of the mobile sector, or start-ups that could be the next big thing.

As this report shows, innovation is blossoming. With the support of the GSMA Foundry, World Mobile has tested a telecoms aerostat in Mozambique that promises to connect rural areas affordably and sustainably. Deployed roughly 300 meters into the air and tethered to the ground, the aerostat provides cellular connectivity covering a radius of up to 130 kilometers, at what World Mobile estimate is just one twelfth of the cost of a traditional terrestrial network. Supported by the Foundry, China Telecom and China Unicom are revealing their experiences from the build and operation of their shared 5G network encompassing more than one million base stations, overcoming multiple challenges, including bandwidth constraints, multi-frequency coexistence, network combination, and 4G/5G coordination, while ensuring a good user experience.

Having spent decades bringing people together, the GSMA is adept at uniting the telecoms industry in pursuit of innovation. As it grows and evolves, the GSMA Foundry will continue to harness that expertise to strengthen the global mobile ecosystem.

In this report, you will find many more inspiring examples of how the Foundry is nurturing mobile innovation and creating value both within the mobile ecosystem and beyond. If you'd like to be part of that, please get in touch and help us find the next great mobile innovations.

Richard Cockle - Head of GSMA Foundry

03. OVERVIEW OF THE
GSMA FOUNDRY

As innovation continues to advance rapidly, the telecoms sector is facing unprecedented disruption. To remain competitive, maximise the impact of their investments and avoid duplicating efforts, mobile operators are increasingly pursuing open innovation. To support that goal, the GSMA Foundry is fostering strategic partnerships, greater collaboration, transparency in projects, and aligning funding opportunities.

Launched in 2021, the Foundry helps companies of all sizes to connect quickly and efficiently to the right stakeholders – and then communicate their solutions and projects' value to the wider market. With a global mandate, the Foundry is nurturing everything from brand-new concepts and products in commercial trials right through to proven solutions that require scaling to a regional or global level.

Now established as a key hub for cross-industry collaboration and business development in the mobile industry, the GSMA Foundry has empowered scores of innovators to swiftly develop their solutions, conduct commercial trials and expand proven solutions that will shape the digital future. The Foundry is at the heart of a dynamic innovation ecosystem where members can collaborate seamlessly with operators, ecosystem partners, and innovators to drive industry advancements. By joining the GSMA Foundry, members can elevate their projects globally, gain international recognition, and participate in events, an annual awards programme, high-profile digital communications, and community discussions.

The GSMA Foundry focuses on the following five areas:

1. **5G:** The GSMA Foundry is at the forefront of 5G innovation, enabling members to develop and scale 5G solutions globally.

2. **Non-Terrestrial Networks:** We foster collaboration to develop non-terrestrial network solutions, such as satellite and drone connectivity.

3. **Artificial Intelligence:** Members can leverage the Foundry to advance AI technology and its integration into the mobile industry.

4. **Efficiency:** We support initiatives to enhance both the energy efficiency and overall efficiency of mobile networks and operations.

5. **Monetisation:** The Foundry helps members explore new monetisation strategies and business models.

Key priorities for 2024

1. **Strategic partnerships:** We are working closely with industry leaders to drive multi-pronged industry initiatives and collaborations, creating new opportunities for growth and innovation.

> "
> The key benefits of being part of the GSMA Foundry are about being able to have working groups, about being able to have discussions, to be part of the industry. And of course we massively respect the GSMA for everything that they are doing and their support to us. I would absolutely recommend that anybody looking to evolve, and to work with the best people, join the GSMA Foundry. It's been fantastic for us and I'm sure it will be just as fantastic for everyone else.
>
> **Micky Watkins -** Founder and CEO, World Mobile

Our recent partnership with the European Space Agency (ESA), for example, is establishing an NTN community, launching challenges and funding opportunities valued at more than £10 million, broadening access to ESA 5G/6G NTN Labs, rolling out education programmes and more.

2. **Launching innovation funding and challenges:** The Foundry plays a pivotal role in matching funding with innovation projects. At MWC 2024, we will launch circa £15 million* of opportunities to support innovative projects and initiatives in the mobile industry. For example, we are partnering with Barcelona Supercomputing Centre, Europe's largest supercomputing centre, to help develop large language models (LLMs) to underpin generative AI systems tailored to local languages and to launch a €1 million prize fund for the best LLM use cases.

3. **Expanding the telco labs network:** Through the Foundry's strategic relationships, it has unique access to a range of industry-leading lab facilities, which members can use to foster collaboration and innovation. For example, Foundry participants will gain privileged access to IBM's watsonx platform to test, develop and even build MVPs (minimum viable products). Meanwhile, ESA will be making its NTN test network available to Foundry participants to enable the real world testing of their innovations.
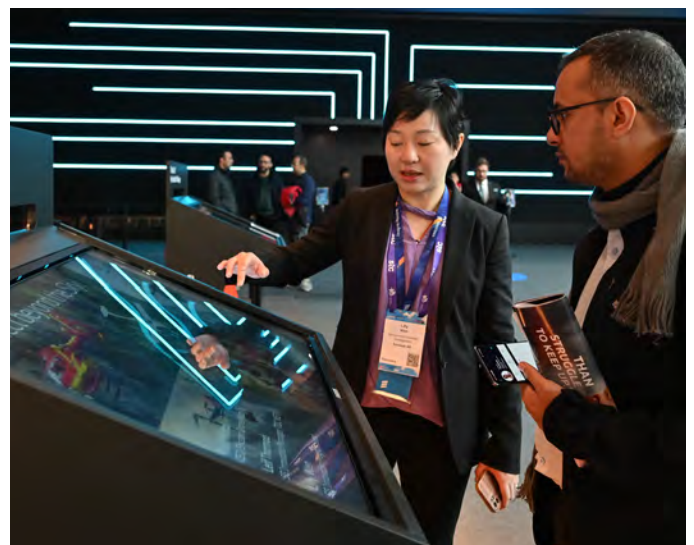
*includes £10m NTN challenges and funding opportunities

The GSMA Foundry Excellence Awards

Presented at MWC Barcelona, these awards recognise the most innovative and significant projects and initiatives in the GSMA Foundry.

In 2023, the winners of the Foundry Excellence Awards were:

→ **5G-Advanced** (Huawei and China Mobile)
Bringing in new wireless technology innovations strengthening the 5G system foundation including improving speed, maximising coverage, enhancing mobility and power efficiency.

→ **5G Catalonia** (Cellnex and partners – Atos, Aumenta Solutions, Lenovo, Masmovil, nae, Nearby Computing, Parlem)
Focusing on promoting digital transformation in Barcelona and its metropolitan area.

→ **5G – Enabling Drones to Fly Beyond Visual Line of Sight** (Ericsson and TDC Net)
Helping the drone ecosystem and global stakeholders to develop common guidelines and regulators to consider consistent and proportionate rules.

→ **Know it all** (P.I. Works)
A new visualisation and analytics tool that can pinpoint a customer's location to within 30 metres, while tracking signal strength, both indoors and outdoors.

→ **Smart Agri** – Automated Farming Solutions (China Mobile and ZTE).
A 5G-enabled farm management solution that is designed to use water, fertilizer, fuel and seeds as efficiently as possible, while dramatically lowering labour costs.

Why you should get involved

At the GSMA Foundry, we fast track projects that deliver real change. We prioritise speed and agility, turning ideas into impactful solutions in months, not years. By streamlining processes and leveraging our network, we enable you to achieve tangible results at an accelerated pace.

Through the Foundry, you will have the opportunity to drive rapid innovation, revolutionise industries, and leave a lasting mark on the mobile industry. We bring GSMA members and industry partners together to evolve new ideas through initial commercial trials and scale proven solutions at a regional and global level. To get involved, please contact foundry@gsma.com.

Foundry Projects

50+ Projects delivered
since **2021**

Foundry Partners

OVER 50 Foundry Partners

Projects implemented by region

North America
8 Projects

LATAM
7 Projects

Europe
17 Projects

Asia Pacific
20 Projects

Sub-Saharan Africa
2 Projects

MENA
7 Projects

Industry Focus

Smart Mobility
24 Projects delivered

FinTech
3 Projects delivered

Logistics, Monitoring and Surveillance
11 Projects delivered

Digital Industries
29 Projects delivered

Networks & Telecommunications
29 Projects delivered

Identity & Verification
6 Projects delivered

Extended Reality
4 Projects delivered

Smart Cities
6 Projects delivered

45+ **Case studies** delivered to date

Focus areas for 2024

Non-terrestrial Networks

Artificial Intelligence

Energy & Network Efficiency

5G

Monetisation

04 Delivering Innovation

04. DELIVERING INNOVATION

5G Co-Construction and Sharing - reducing deployment costs
5G, Energy and Network Efficiency

As they roll out 5G, mobile operators are exploring how to reduce network construction and operation costs, while bringing this advanced technology to billions of people. To avoid overlapping network construction by different individual operators, China Telecom and China Unicom have developed the 5G network co-construction and sharing solution. The goals are to reduce construction and operation costs and energy consumption, effectively improve spectrum utilisation, and enable broader deployment of advanced mobile networks.

Project value:

Since they began working together in 2019, the two operators have tackled many network sharing challenges, including bandwidth constraints, multi-frequency coexistence, network combination, and 4G/5G coordination, while ensuring a good user experience. They claim to have built the world's first and largest 5G standalone shared network encompassing more than one million base stations, realising one physical network, two logical networks, and multiple customised private networks, and laying a solid foundation for large-scale industrial applications.

Network co-construction and sharing
provides four primary benefits

the **reduction of** **CAPEX** ↓↓

integration of operator resources for **maximum** ↑↑ **efficiency**

quality of ↑↑ 5G services **improvements**
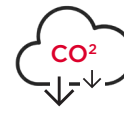
carbon emissions of base stations **reduction** ↓↓

China Telecom and China Unicom

2022 **1m** base stations deployed = more than **40%** of all **5G base stations** globally

Partners: China Telecom, China Unicom, Datang Mobile, Ericsson, Huawei, ZTE

Connecting the Unconnected – Africa's first commercial telecoms aerostat

Non-Terrestrial Networks

About 5% of the global population live in areas without mobile broadband coverage, meaning more than 400 million people have no access to the internet. More than 180 million people in Sub Saharan Africa, or 15% of the population, live in an area with no coverage, while 59% of the population have coverage, but remain unconnected for various socio-economic reasons. This lack of connectivity has a significant impact on access to healthcare, education, financial inclusion, and economic opportunities.

With the support of the GSMA Foundry, World Mobile has launched Africa's first commercial grade telecommunications aerostat in Mozambique, aimed at connecting rural areas affordably and sustainably. The data and insights gathered from several weeks of test flight operations will be used by World Mobile to deploy additional commercial aerostats across Mozambique, Africa, and other under-connected regions around the world.

Project value:

World Mobile aerostats are deployed roughly 300 meters into the air and tethered to the ground,

providing last-mile connectivity using a custom radio payload. The aerostats offer standard cellular connectivity covering a radius of up to 130 kilometers, overcoming the challenges of terrain, infrastructure, and cost that often hinder the expansion of mobile networks. World Mobile estimates this approach can cost up to 12 times less than traditional network configurations.

> We are excited to partner with the GSMA Foundry to bring this innovative solution to Mozambique. Our goal is to connect the unconnected and close the digital divide in Africa. We believe that everyone has the right to access the opportunities that mobile internet can offer. By using aerostats and a blockchain-based sharing economy, we can provide low-cost, high-quality, and community-owned connectivity to millions of people

Micky Watkins - Founder and CEO, World Mobile

Internet Coverage
Living without internet access

5% Live in areas without mobile broardband

>400m

Global population with no internet access

Sub-Saharan Africa

180m or **15%**

Live in areas with no internet access

59% Live in connected areas but for several socio-economic reasons, remain unconnected

Partners: World Mobile, Vodacom

Towards Green – cutting networks' energy consumption

Energy and Network Efficiency

While 5G networks transmit data using less energy per gigabit than their predecessors, the growing volume of traffic - and the necessary network densification to support it - could lead to increased energy costs and associated carbon emissions.

Huawei, together with partner operators, is implementing diverse measures to bolster energy efficiency, while safeguarding the end-user experience. These measures include the deployment of all-optical network architectures, increased use of outdoor equipment to reduce the reliance on air conditioning within buildings and cabinets, and the implementation of 'deep dormancy' for network elements, allowing them to power down when not in use.

Huawei is also implementing dynamic frequency adjustment, highly integrated radio frequency equipment modules, optimised antenna positioning, passive antenna techniques and AI tools for data-driven generation and execution of network energy efficiency policies.

Project value:

Operators are working towards a more energy-efficient future, while ensuring a seamless end-user experience. For example, China Mobile expects the nationwide application of an energy-saving and carbon-reduction framework system to save 6.68 billion kWh of electricity and reduce 383,000 tons of carbon emissions annually. Zain is using artificial intelligence to improve the energy efficiency of its 5G network in Kuwait. Finally, Etisalat establishes a climate innovation hub and pilots solutions to lower emissions and energy usage.

Operator costs

25% Operator costs = Network Operational Expenditure (OpEx)

of which **90%**

are energy consumption, mainly encompassing **fuel and electricity usage**

Environmental Benefits

383,000 **tons**

of **carbon emissions reduced** annually

Partners: Axiata, China Mobile, Etisalat, Huawei, Smart, Zain

5G Automated Farming – greater output, less waste

5G, Digital Industries, IoT, Smart Mobility

ZTE and China Mobile are using 5G connectivity to fully automate rice production on 12,000 acres (almost 19 square miles) of marginal land near Da'an City, Jilin Province. A smart irrigation system is helping to make the depleted soil fertile again, while remote controlled machinery and drones have made the farm operations more efficient, productive and sustainable.

ZTE and China Mobile developed a farm management solution that, amongst other things, enables a worker located in the farmhouse to use 5G connectivity to remotely control between three and five machines simultaneously, significantly boosting productivity.

Project value:

The deployment points to how the world can increase sustainable food production to support a growing population cost-effectively. ZTE says a trial of the system generated a 10% increase in output, together with savings in materials and labour costs, while the smart irrigation system uses 40% less water than a conventional system.

Economic benefits

3.3m ¥ through 10%
increase in output as well as **savings in materials and labour costs**

Smart Irrigation System using

40%
less water than a conventional system

Partners: China Mobile, ZTE

Digital Twin Network Lifecycle Management for the Asian Games

Digital Twin, Network Sharing

China Telecom and China Unicom are using a dynamic and detailed 3D model to optimise the performance of their joint network during major events attended by large numbers of people. The digital twin provides the operators with a continuous and very detailed view of the network's performance, enabling them to efficiently optimise the allocation of resources.

During the Asian Games in Hangzhou in September and October 2023, the digital twin was used to monitor the network performance on a 10 by 10 metre grid and predict traffic peaks, so counter-measures could be prepared in advance. In the event of a network issue, the digital twin uses AI to identify the optimal solution in a matter of seconds.

Project value:

During the Asian Games, which drew 600,000 4G/5G users to Hangzhou, China Telecom and China Unicom achieved a remarkable 99.82% 4G/5G connection rate. The two operators and ZTE plan to employ digital twins to support their shared networks in more cities in China. The technology can be used to improve energy efficiency and reduce costs, as well as to provide service assurance for end-users.

Asian Games
Connection rates

600,000 4G/5G users

99.82% connection rates of

Partners: China Telecom, China Unicom

MOBILE EDGE **COMPUTING**

5G and XR Enabled Digital Twin Store – compelling co-presence
B2B2X, XR, Retail

Tech companies Sturfee and Mawari, with operators KDDI and Telefonica, are using extended reality (XR) technologies to bring people together in the same place. The partners have developed a solution that enables a shopper in a physical store, for example, to be joined by an avatar of a shop assistant in a remote location. The solution has been piloted in a Ginza store in Tokyo, to help shoppers based in both Japan and Spain.

The assistant sees the shopper's avatar inside the digital twin of the store, understanding the exact location and context, and can interact and communicate as if they are both present together in the retail store. The shopper, through their handset's augmented reality capabilities, sees the avatar of the shop assistant, as if they were present in the store. The low latency of 5G networks allows the delivery of a high-fidelity avatar that has the actual facial expression of a real person.

Project value:

The project points to how retailers can use 5G and XR to provide shoppers with a better experience by enabling them to immediately access assistance in a store or visit shops virtually without leaving their home. It also identified the minimum requirements for this type of service to run on LTE and 5G networks. At the same time, the pilot provided insight into how these technologies can be extended to create new social and commercial experiences across borders.

> "
> In this project we create a digital twin for the person that is abroad and we merge the real world with the virtual world in a simultaneous experience for both parties
>
> **Luis Ramirez -** Founder and CEO, Mawari

Partners: KDDI, Mawari, Sturfee, Telefonica

Bridge Alliance Federated Edge Hub – enabling immersive entertainment

MEC Federation, XR

Using Summit Tech's Odience platform, this project allowed people in Singapore and Bangkok to experience a virtual reality concert taking place in Montreal in 8K resolution. Making this possible depended on the Bridge Alliance Federated Edge Hub (FEH), which interconnected each operator's multi-access edge computing (MEC) cloud platforms in separate locations.

The result was a live production with near-zero delay, enabling viewers in Asia to seamlessly connect with performers in Canada. Streamed on mobile devices and VR headsets, people were able to interact in real time in multiple ways, such as asking questions and voting on music. The Bridge Alliance established the FEH to enable application providers to seamlessly provision telco edge resources across many countries, greatly simplifying ultra-fast transfer of vast quantities of data, such as video for low latency immersive applications.

Project value:

The solution could open up a new medium for e-commerce, sporting fixtures, corporate events, e-learning and myriad other applications.

Brands now have the power to engage with their customers with more creativity and develop new revenue streams through e-commerce plugins, personalised micro-services and enhanced digital experiences. Mobile network operators can accelerate these commercial opportunities by working together to share infrastructure.

> "
> This project addresses the challenge of delivering content across multiple operators, because we have to deliver our video steams to everyone that wants to watch them and the key to that is being cross-operator and having it work across the ecosystem in a clean and consistent way
>
> **Ron Nessim -** Chief Process Officer, Summit Tech

Partners: Bridge Alliance, AIS, Singtel, Summit Tech

5G **DRONES**

5G – Enabling Enterprise Drones to Fly Beyond Visual Line of Sight
B2B2X, Smart Mobility

Ericsson Drone Mobility, together with TDC NET and ecosystem partners are working on 5G-enabled communication infrastructure for UAS. This will help to find innovative solutions, making a vast pool of telecom intelligence accessible to the drone ecosystem, and finding ways to ensure they are constantly connected to trusted and secured network- the Mobile Network.

Project value:

There is growing demand for beyond visual line of sight operations, which can be enabled by using mobile connectivity for command-and-control functions and the actual delivery of the data from the drones and their applications. Drones could tackle a variety of use cases from games to environmental and field inspections, precision farming, delivering lifesaving supplies or acting as first responders in accidents.

Rajpal Deol, Director, Portfolio Management at Ericsson Business Area Cloud Software & Services showcases the GSMA Foundry Project '5G Drone Testing' at MWC Las Vegas 2023

5G Drone Testing
B2B2X, Smart Mobility

Ericsson is working with the Foundry on projects to study the technical implications of commercialisation of connected drones on mobile networks. The network performance monitoring and engineering study is focused on an assessment of a variety of network KPIs, including signal strength, downlink, uplink, interference, and video performance with tests performed at various altitudes up to 400 feet.

Phase one of the study will provide a network baseline, while phase two will cover network adjustments.

Project value:

The use of cellular networks will help the drones industry to support more use cases, while opening up business opportunities for operators and other ecosystem members.

Partners: Ericsson, Ercisson Drone Mobility, TDC Net, T-Mobile, Verizon

## 5G Drones – for inventory management and surveillance

AI, Smart Mobility

At Telefónica's headquarters in Las Tablas, Madrid, Unmanned Life has demonstrated the use of 5G-connected drones for surveillance. The demo employed two drones controlled and managed by Unmanned Life's software platform. Once the mission was underway, high-quality video was streamed in real-time to Telefónica's security centre, where an AI-based person recognition system automatically spotted any unauthorised entry to the site.

Project value:

The project demonstrated how drones can cut costs dramatically by providing a flexible and efficient means of surveying large areas and detecting problems in real time. As the drones are equipped with high-definition camera payloads, they provide a level of detail that would not previously have been possible at various perspectives and angles. They can also be flown to formerly inaccessible areas, whilst reducing the need for human operation.

The Unmanned Life and Telefónica system is designed especially for companies that lack specialised personnel in surveillance and security functions or for those that want to assign their human teams to perform other tasks of greater added value.
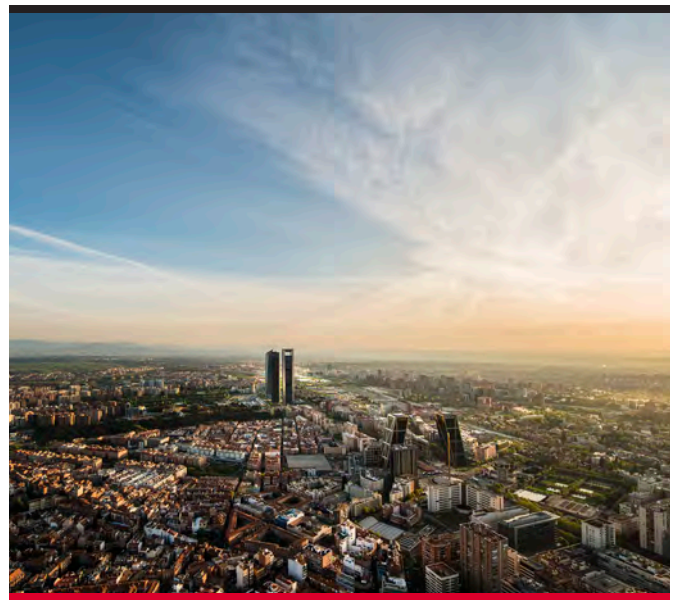
Partners: Telefónica, Unmanned Life

5G New Calling – opening up new communications services

Digital Twin, Network Sharing

5G New Calling, developed by China Mobile and Huawei, promises to open up new revenue streams for mobile operators. Through new 3GPP standards, New Calling enables operators' voice and video calls to be enriched by real time translations, image analysis, animations and various other digital content. In February 2023, China Mobile and Huawei set up a joint project to promote the concept, further standards cooperation and industry maturity, and encourage the commercial use of New Calling.

Project value:

Unlike internet-based apps, people can access New Calling without having to download any software, enabling businesses to use New Calling capabilities to improve customer service and interaction with clients. These capabilities also promise to make operators' communications services fun and feature rich, as well as reliable, secure and easy-to-use.

By the end of 2023, China Mobile had commercialised 5G New Calling services on a large scale, reaching five million users, providing people with text captions in their own language during video calls. Huawei estimates that these services will bring tens of millions of dollars in revenues by 2025. The technology is also being used to accelerate insurance claims, reducing the time taken to assess damage from two hours to five minutes, and lowering costs by more than 50%, according to Huawei.

Improved Efficiency
with New Calling

Jingyou, automobile insurance information service, introduced New Calling to provide remote damage assessment services

OVER 50% reduction in assessment **costs**

➕ shorten the time to improving efficiency

Time reduction
2hrs ●—— **5mins**

Partners: AIS Thailand, China Mobile, Huawei, Itau, Telefónica Brazil, Vodafone, Zain Kuwait

5G-Advanced – fundamental upgrades to performance
IoT, Network Services, XR

5G-Advanced (5G-A) networks are set to support more applications, in more locations and at far greater scale, enabling reliable everyday services with high quality connectivity. The GSMA Foundry is bringing the industry together to shape the roadmap for 5G-A.

Huawei's tests of 5G-A cross-layer collaboration technology have demonstrated that forthcoming cellular networks will be able to deliver highly immersive extended reality (XR) experiences. Conducted in Hangzhou, Zhejiang province, China, the tests explored how 5G-A networks could support very high-resolution virtual environments generated by computer technologies and wearable devices.

Huawei and China Mobile have also conducted field tests of a passive Internet of Things (IoT) solution, which enables large numbers of sensors to transmit data without the need for batteries. Conducted in Chengdu, Sichuan province, China, the tests used a prototype 5G-A network.

Project value:

5G-A promises to support new forms of remote interaction and create new digital communities in the entertainment, training and education sectors. 5G-A provides the high data rates and low latencies required for the mass adoption of virtual reality, augmented reality and XR. At the same time, 5G-A will further strengthen support for low cost, low power-devices, such as industrial wireless sensors and wearables. This will make it far easier for business to integrate sophisticated IoT services into their operations, which will ultimately bring more engaging, cost-effective products to everyday life.

> "
> 5G-Advanced, the next milestone in the 5G era, has demonstrated the innovativeness and future potential of the already standing 5G ecosystem with improvements to speed, coverage, and efficiency. Enhancing the XR capabilities and sustainability within AI & Machine Learning designs, 5G-A has created several business opportunities for the global enterprise market
>
> **Richard Cockle -** Head of GSMA Foundry

John Gao, President of 5.5G domain, Huawei collects a GSMA Foundry Excellence award for the project '5G-Advanced' at MWC Barcelona 2023

Partners: Huawei, China Mobile

5G mmWave – super-fast connectivity in densely populated places
Network Coverage

5G mmWave helps deliver on the full promise of 5G with ultra-reliable and superfast high-bandwidth connectivity in high traffic, high density scenarios. The 5G mmWave Foundry project has produced reports on how to resolve situations where signals can be blocked and interrupted by objects and people. For example, operators seeking to deploy high-density outdoor hotspots could begin by co-siting existing LTE sites to prevent coverage gaps. Operators can also make use of mmWave's extended range capabilities to provide fixed wireless access to sparsely populated communities.

To support the widespread deployment of 5G mmWave, the GSMA has established the 5G mmWave Accelerator Initiative, led by major industry organisations, such as China Unicom, Deutsche Telekom, Ericsson, NTT Docomo, Qualcomm, Telefonica, Telstra, TIM, Verizon and ZTE.

Project value:

At the end of March 2023, 22 mobile operators in 12 countries had launched 5G mmWave services, according to GSMA Intelligence, and there has been solid growth in the number of 5G mmWave devices coming to the market in the past 24 months.

The GSMA 5G mmWave Accelerator Initiative is sharing mmWave intelligence, developing best practices and investigating use cases that will help the 5G industry realise its forecast of contributing US$5 trillion to the global economy by 2025.

5G mmWave

Train stations **Airports** **Stadiums** **Industry 4.0**

Scenarios that benefit from the capabilities of 5G mmWave
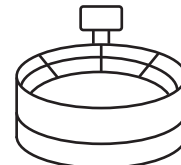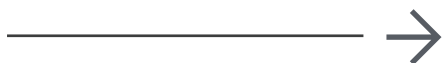
Extreme bandwidth + **Data speeds** + **Responsiveness**

Partners: China Unicom, Deutsche Telekom, Ericsson, NTT Docomo, Qualcomm, Telecom Italia, Telefónica, Telstra, Verizon, ZTE

Sony for NTN - using Murata's 1SC module and Skylo's network

IoT, Non-Terrestrial Networks

Legacy cellular networks cover over 80% of the population but only reach less than 40% of the land and less than 20% of the earth. Satellite connectivity has traditionally provided ubiquitous coverage but its high cost limited its use to specific scenarios like TV and broadcasting. In the Internet of Things (IoT) domain, satellite connectivity was considered a last resort option compared to terrestrial networks. However, with the continuous drop in the cost of non-terrestrial network (NTN) solutions in recent years, it becomes economically feasible to use NTN communication for Internet of Things devices, meeting the need for communication everywhere.

A partnership between Skylo, Murata and Sony marks a significant milestone in the IoT industry, bringing 5G-ready NB-IoT over satellite for the first time. This breakthrough collaboration not only delivers substantial cost and interoperability advantages but also contributes to the standardisation and accelerated adoption of NB-IoT over satellite in future 3GPP specifications.

For industries with assets deployed worldwide, such as logistics and vehicle trackers, agriculture, and personal monitoring, the availability of carrier-grade, affordable IoT connectivity, enabled by all parties, is a game-changer. Altair's field-proven, ultra-low-power, and ultra-small chipset solutions are perfectly suited for industrial use cases, facilitating efficient data exchange.

Project value:

With the seamless integration of Skylo's satellite connectivity, customers now have the added capability to utilise satellite connectivity alongside cellular networks, regardless of their location on the planet. Leveraging Sony's mass-produced Altair cellular IoT chipsets for cellular networks, Murata is able to manufacture the 1SC module at an affordable cost, passing on the savings to its customers. This eliminates design complexities and the need for additional hardware, allowing device manufacturers to connect wearables, sensors, and trackers directly over satellite.

The NTN connectivity powered by Sony's Altair chipsets, enables connected devices to be deployed anywhere, providing truly global coverage. The automatic switching from cellular to satellite connectivity further enhances the seamless user experience without requiring any hardware changes. This solution expands the availability of satellite connectivity to a wide range of IoT devices and wearables, unlocking new customer experiences that were previously unattainable. It fulfils the promise of connecting anyone, anything, anywhere.

Partners: Sony Altair, Murata, Skylo Technologies

Passive IoT – automating asset tracking

B2B2X, Digital Industries, IoT

China Mobile has developed a passive IoT system, called e-Lark®, that could pave the way to greater automation of asset tracking. As it can connect devices that lack their own power source, the system reduces the financial and environmental costs associated with using batteries for traditional IoT connected devices. Designed to read RFID tags at distances of 20 metres with 100% accuracy, the e-Lark® Advanced Passive IoT System has now been applied in dozens of vertical scenarios.

Project value:

Comba Telecom has deployed e-Lark® in a warehouse of more than 1,000 square metres. This has resulted in a 70% improvement in management efficiency, a 50% reduction in management costs, and increased asset turnover rate by 40%.

Business benefits

70% ↑↑
management efficiency
improvements

50% ↓↓
reduction of
management costs

40% ↑↑
increase in asset turnover
rate

Partners: China Mobile, Comba Telecom

Nokia Network as Code – programmable networks

Network Services, Open Gateway

At the Nokia Arena in Tampere, Finland, Elisa and Nokia have deployed a programmable 5G mmWave network to showcase advanced solutions for sports, entertainment and other events. The network employs Nokia's new Network as Code platform, which uses technical standards developed by the Linux Foundation CAMARA project and the GSMA Open Gateway initiative. The platform abstracts network complexities and exposes developer-friendly interfaces that can be used to deploy apps across multiple public and private networks. Nokia is providing software development kits that remove the need for the app provider to know the details of how a network works or which provider is offering the service.

Bill Stanley, Portfolio Manager at Nokia, provides a demonstration of Nokia's 'Network as Code' at MWC Las Vegas 2023

Project value:

The Network as Code platform enables a network to be programmed to meet the connectivity needs of demanding applications, such as a live high-definition video stream or a remote-control system. This kind of programmability could make it easier for mobile operators to monetise new software-based networks and open new revenue streams.

ⓘ What is Open Gateway?

GSMA Open Gateway is a framework of common network Application Programming Interfaces (APIs) designed to provide universal access to operator networks for developers. Launched with the support of 21 mobile network operators, the move represents a paradigm shift in the way the telecoms industry designs and delivers services in an API economy world.

GSMA Open Gateway will help developers and cloud providers enhance and deploy services more quickly across operator networks via single points of access to the world's largest connectivity platform.

Partners: Nokia

Authorised push payment fraud

B2B2X, Fintech, Identity and Verification

Over the past four years, Authorised Push Payment (APP) fraud, where a customer is fooled into making a payment, has grown rapidly. The GSMA and UK Finance (the trade association for UK banks) agreed to create a framework to bring together banks and operators to explore opportunities to utilise network application programming interfaces (APIs) to fight fraud. This process has led to the creation of a brand-new API called 'scam signal', which banks can use to fight APP fraud, even when customers authorise the payment. The API is now commercially live from the UK mobile network operators and is being adopted by UK banks.

Project value:

In the UK, APP fraud is resulting in losses of £485 million a year (Source- UK Finance Annual Fraud Report 2022) and is now regarded by UK Finance as a "national security threat." A study with a leading UK bank concluded that the new API would be likely to see an increase in detected scams of around 20-25%, if adopted across the banking sector. Subsequent analysis proved that combining the API data with banks' own data points would help to reduce false positive rates (the number of good customers negatively impacted by counter measures) to very low levels, proving the real value of the API. The solution is part of a global project to leverage network insights to help fight fraud.

£ APP fraud impact

£485m losses in the **UK** per annum

likely **increase** of **detected scams** with **new API** **20-25%**

Enterprise authentication for financial mobile apps

B2B2X, Fintech, Identity and Verification

People are making growing use of mobile devices to access financial applications. As financial service apps contain valuable information, the user must be securely authenticated before accessing the service. Currently most financial services rely on SMS for authentication, but this can be hijacked, and the PIN can be obtained by a bad actor.

In Pakistan, Jazz has tested the technical feasibility of seamlessly authenticating a user, without human intervention, by leveraging the features of the mobile network. The technical feasibility is being tested against two Jazz applications, the JazzWorld App for customer relationship management and the JazzCash app for mobile financial services. Success was measured on whether authentication was possible using a combination of only network parameters seamlessly verified together. These combinations may include MSISDN, IMEI and IP assigned to the user for the data session.

Project value:

After successfully completing technical feasibility and orchestrating the Enterprise Authentication (Mobile-ID) solution, Jazz Pakistan has achieved a pivotal milestone with a commercial pilot on Jazz-World App. This one-stop digital solution for all Jazz accounts, covering charging, billing, and bundle subscriptions, marks a significant step.

Encouraged by this success, the commercial rollout is imminent, followed by extending to mobile wallets starting with Jazz's own JazzCash and other industry financial apps. The ambition is to make a substantial impact on the local industry by addressing security vulnerabilities tied to legacy SMS OTP.
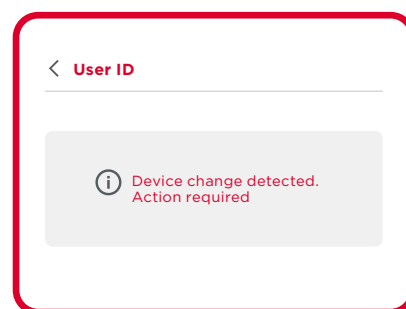
Commercial use cases

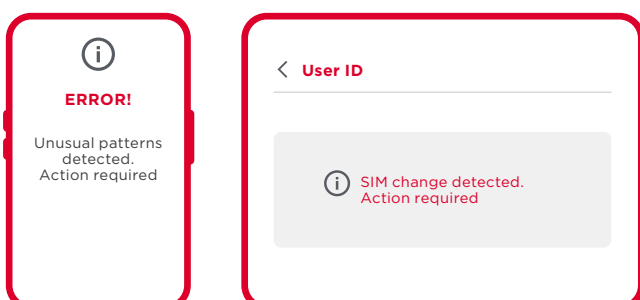### Instant access
No passwords
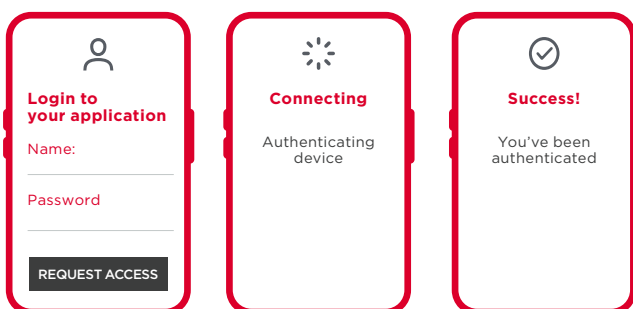
Device change detection
Real-time flagging of device change. Proactive notification available.

SIM swap protection
Real-time flagging of SIM change in the user device. Proactive notification available

No Passwords: improve user experience and services access rates.

Fraud protection: Real-time flagging of SIM change in the user device. Proactive notification available.

Fraud protection: Real-time flagging of device change. Proactive notification available.

Partners: Jazz Pakistan

GSMA 5G Transformation Hub
The world's most innovative 5G solutions

The GSMA's 5G hub has brought together exciting case studies. Launched at MWC Barcelona 2022, the 5G hub is an innovation portal showcasing over 50 of the world's most compelling 5G solutions, thereby sharing best practice around the globe. The GSMA

5G Transformation Hub is an authoritative source of information on current live 5G solutions with case studies detailing design, benefits, key players, measured value and the future positive impact of scaling up these solutions worldwide. Six winners were announced in the 5G Hub challenge at MWC Barcelona 2023.

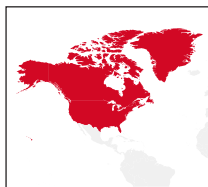## 5G Hub Case Studies

50 **Case studies**
since **2021**

GSMA 5G Hub

Visit
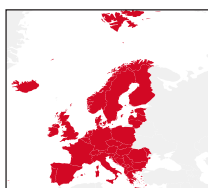**www.gsma.com/5ghub/**
to view all case studies

Case Studies by region

North America
4 **Case studies**

South East Asia
6 **Case studies**

Europe
11 **Case studies**

East Asia
28 **Case studies**

Case Study Categories

Smart Production
22 **Case studies** delivered

Energy
5 **Case studies** delivered

Living
5 **Case studies** delivered

Entertainment
7 **Case studies** delivered

Productivity
11 **Case studies** delivered

mmWave
5 **Case studies** delivered

GSMA #5G Industry Challenge Awards Winners

GSMA 5G Smart Production Challenge
5G Enables Digital Transformation of Manufacturing

Hotel Star, China Mobile and ZTE

GSMA 5G Living Challenge
How 5G is Transforming Healthcare

True, Huawei, Siriraj Hospital in Bangkok

GSMA 5G Innovation Challenge
How 5G lowers the barriers for live broadcasts

TVU Networks

GSMA 5G Energy Challenge
Dual-frequency 5G networks for smarter coal mining

Dahaize Coal Mine, China Mobile, China Coal Group Shaanxi Company, China Coal Technology Engineering Group Mine Intellectualisation Co., Ltd., China Broadcasting Network Group, and China Coal Information Technology (Beijing) Co., Ltd., ZTE Corporation

GSMA 5G Productivity Challenge
5G Makes Sea Fishing Safer and More Lucrative

Guangdong Yangjiang Municipal People's Government, China Unicom Guangdong Branch, Huawei

GSMA 5G Entertainment Challenge
How 5G is transforming sports for spectators

Verizon, the NFL, Aifi

05 Partnering for Innovation

05. PARTNERING FOR INNOVATION

At GSMA Foundry, we believe that partnerships are the driving force behind innovation. Collaborative efforts bring together diverse expertise and resources, enabling us to address global challenges and shape the future of mobile technology. Join us in this transformative journey, and together, we'll unleash the potential of partnerships to propel industries forward.

"

That's what the GSMA Foundry is all about. Connecting people and companies together that will eventually provide solutions to the rest of the world

Margaux Berry - VP of Growth and Strategy, BeWhere

"

GSMA Foundry is a very good initiative as it helps to bridge the gap with the operators, also brings other startups together, it's a very good platform to the world

Luis Ramirez - Founder and CEO, Mawari

"

They are absolute experts in bringing the different ecosystem partners together. Being at the GSMA Foundry here (MWC Barcelona) and showcasing gave us an opportunity to interact with a lot of stakeholders, normally mobile operators but also enterprises came back to us and understood how GSMA mobile operators can really help them, and also different partners in the ecosystem

Kapil Mittal - CEO, Ericsson Drone Mobility

"

GSMA Foundry has been invaluable at all stages of the dissemination process, from writing detailed project case studies to hands-on showcases at MWC. Not only this, but they are extremely knowledgeable about the industry, well-connected, transparent, and efficient. We made genuine business connections that are still going strong to this day as a result of the Foundry

Jorge Munoz - Co-Founder and VP, Unmanned Life

EUROPEAN SPACE AGENCY

The GSMA Foundry and the European Space Agency (ESA) have partnered to merge mobile and satellite technologies, aiming to integrate satellite communications with 5G and future 6G networks. Working alongside ESA's 5G/6G Hub, this partnership promises groundbreaking advancements bridging terrestrial and non-terrestrial networks, driving progress in mobile and satellite industries.

> **"**
>
> Collaboration is key to telecommunications innovation, and, from our 5G/6G Hub, we are fostering industry partnerships to advance the 5G digital transformation of society and industry. We look forward to working with GSMA to explore and realise the huge potential of next-generation satellite-enabled connectivity
>
> **Antonio Franchi -** Head of Space for 5G and 6G Strategic Programme, ESA

The GSMA and European Space Agency (ESA) sign a Memorandum of Intent (MOI) to bring the mobile and satellite industries closer together to collaborate on developing new, innovative satellite and terrestrial networks technologies

> **"**
>
> By collaborating more closely with the European Space Agency, and its satellite network operator ecosystem, we hope to accelerate the immense potential satellite and terrestrial telecommunications networks can create for consumers and businesses when they are more closely connected. By working together, we can help the communications industry bring innovative solutions to market, which in turn will create tremendous benefits to society by connecting even more people, wherever they are in the world
>
> **Alex Sinclair -** Chief Technology Officer, GSMA

Find out more about the ESA and GSMA Foundry partnership here:

IBM

IBM

The GSMA Foundry and IBM are collaborating to support the adoption and skills of generative artificial intelligence (AI) in the telecom industry, including a new opportunity which provides GSMA members with access to IBM's watsonx. This platform is intended to help telecom industry players explore innovative industry-specific use cases of Generative AI, enabling members to improve cost leadership, revenue growth and enhance customer experience.

"

Artificial Intelligence provides the telecoms industry, and the societies it serves, with huge opportunities to launch new services, improve connectivity and customer experience. Overall, it's estimated that AI could contribute $15.7 trillion to the global economy by 2030. However, it's critical that AI is democratised to ensure that all parts of the connectivity industry and their customers, wherever they are in the world, benefit. Bringing operators access to AI tools and knowledge, alongside the necessary skills, access and training, is key to achieving this

Alex Sinclair - CTO, GSMA

"

As a world leader in AI for business, IBM will provide critical support to this training for the telecom industry through this collaboration with the GSMA. Generative AI can create massive opportunities for communication service providers as they look to optimize current processes, and like the GSMA, our goal is to offer this technology within the industry, which we're making possible through watsonx

Stephen Rose - GM, Global Industries, IBM

Find out more about the IBM and GSMA Foundry partnership here:

4YFN

4YFN and GSMA Foundry are collaborating to drive innovation in the mobile and tech industries. Startups in the 4YFN ecosystem can tap into resources, mentorship, and funding opportunities through GSMA Foundry, enriching the program with innovative ideas. This partnership fuels innovation, propelling digital transformation and inviting startups to apply for the 4YFN Awards.

Richard Cockle, Head of GSMA Foundry and Pere Duran, 4YFN Event Series Director, sign the partnership agreement between 4YFN and the GSMA Foundry.

> The startups of today are the future of our industry, and we need to do everything we can to support their journey. The partnership between 4YFN and the GSMA Foundry enhances the opportunities for both startups and large corporations to innovate together and make an impact. 4YFN and the GSMA Foundry address different, yet complementary, stages in the innovation cycles of digital businesses and we expect this joint step will increase the flow of innovations into our industry. The GSMA Foundry will play a critical role helping 4YFN entrepreneurs with resources and expertise, and most importantly, with access to real industry scenarios and challenges where they could validate and commercialise their products

Pere Duran - 4YFN Event Series Director

Find out more about the 4YFN and GSMA Foundry partnership here:

5G INNOVATION GROUP (5G IN)

GSMA 5G IN aims to help grow and scale innovation communities that leverage 5G and adjacent digital technologies. It brings together mobile operators, leading investors and ecosystem stakeholders to discover high-quality start-ups and scale-ups in AI, IoT, edge computing, cloud computing, big data, 5G infrastructure, security, chipset, AR/VR/XR, fintech and other vertical applications, and work with them to propel the commercialisation of 5G applications.

Within the GSMA Foundry, the project has evolved into a global partnership framework with much greater reach. As a result, 5G IN has formed a collab-oration with the Hong Kong Science and Technology Park and Deutsche Telekom to launch a joint 5G IN Digital Ecosystem Innovation Centre.
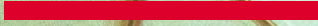
HKSTP will continue to collaborate with stakeholders from government, industry, academic and research sectors to capitalise on the abundant opportunities arising from the national 14th Five-Year Plan. We are pleased to cooperate with the GSMA and Deutsche Telekom to attract technology companies from the 5G ecosystem. We look forward to more participation from tech ventures, so they can make full use of the advantages and resources from our innovation & technology ecosystem, to deliver greater value

Albert Wong - CEO of the Hong Kong Science and Technology Parks Corporation

Connectivity is a global driver of innovation, and this is exactly what the 5G IN Digital Ecosystem Innovation Centre wants to accelerate. The GSMA is now delighted to join hands with HKSTP and Deutsche Telekom to provide innovators with a prosperous and creative platform where they can connect and influence with each other to grow and scale

Sihan Bo Chen - GSMA's Head of Greater China

Partners: Deutsche Telekom, Hong Kong Science and Technology Parks Corporation (HKSTP), GSMA

06

Get Involved

06. GET **INVOLVED**

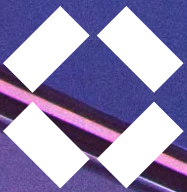**Don't miss the opportunity to play a pivotal role in shaping the future of mobile technology.**

Contact us:

foundry@gsma.com
www.gsma.com/Foundry

Richard Cockle
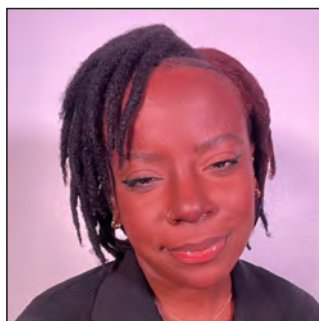
Head of GSMA
Foundry

Faisal Zia

Business Development
and Partnerships

Nicola Gordon

Marketing and
Communications

Andrew Bell

Programme
Delivery

Jessica Bukenya

PMO and Project
Coordination

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