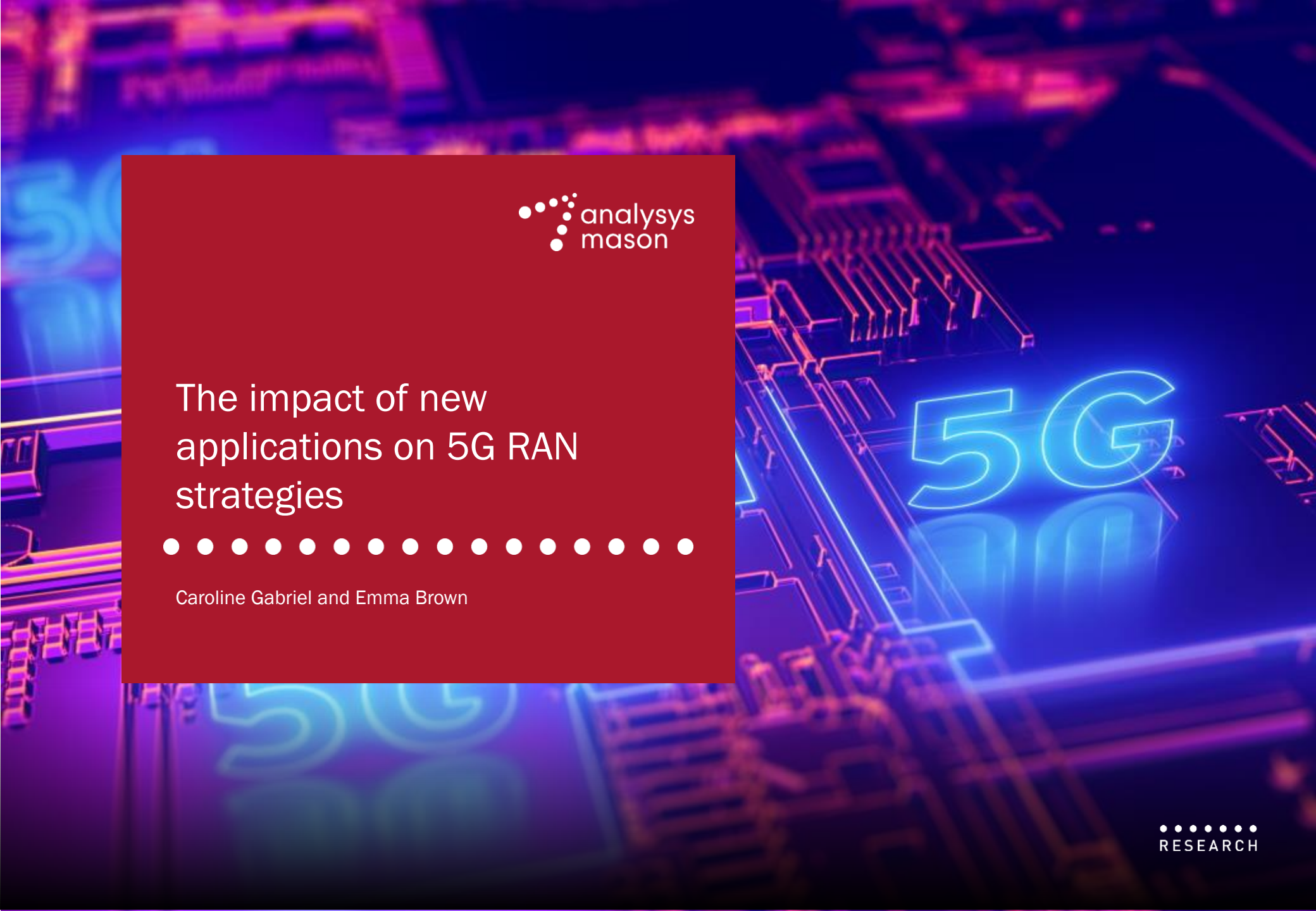

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The impact of new applications on 5G RAN strategies

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RESEARCH

About this report

In this report, we identify the capabilities that will be needed to enable a wide range of revenue-generating 5G services, as well as 5G network performance that these capabilities require. We also examine the cost of adding these capabilities to the generic 5G RAN so as to assess the ROI.

The report is based on:

- Analysys Mason's internal research such as case study reports and surveys of operators and enterprises
- interviews with stakeholders in the advanced RAN sector.

CASE STUDIES

- AT&T
- China Mobile
- Deutsche Telekom
- NTT DOCOMO
- Ooredoo
- Orange France
- Telia Sweden
- Telstra
- Verizon
- Vodafone UK

KEY QUESTIONS ANSWERED IN THIS REPORT

- Where are operators starting to deploy, or perceive demand for, new 5G services?
- What RAN capabilities are the most important to support these services, and what RAN performance requirements do they have?
- What are the challenges (including costs) related to supporting these performance requirements and a differentiated experience, especially with regard to ultra-low latency?
- How can operators pursue new markets while mitigating the risks of making the wrong choices in an immature market?

WHO SHOULD READ THIS REPORT

- CTOs and heads of RAN strategy or architecture within 5G operators.
- Strategy departments studying enterprise 5G opportunities.
- Vendors and integrators with capabilities in specialist radio deployments.

Executive summary

Operators will find it difficult to generate new revenue without investing in advanced 5G RAN capabilities such as ultra-low latency, but the business case for new services such as 5G robotics is not yet completely clear. Operators should therefore invest in capabilities that can be used as differentiators in a wide variety of situations.

Emerging advanced consumer and enterprise applications have diverse and demanding connectivity requirements and distinct value chains. This breaks the traditional economies of scale of the established generic mobile broadband model. Operators that intend to differentiate their 5G services based on advanced RAN performance need to prioritise RAN capabilities that can support a wide range of markets and use cases in order to mitigate the risks of a fragmented commercial landscape and to enable flexible support for current and emerging opportunities.

KEY RECOMMENDATIONS

- Operators should identify service categories with proven demand across multiple sectors and applications, and should learn from early movers.
- Operators should prioritise investing in RAN capabilities that support use case categories that have the most operator revenue potential.
- Operators should explore multiple ways to monetise a highly differentiated RAN, including using consumer, enterprise and wholesale models.

Figure 1: Balance between the costs and challenges of supporting advanced 5G RAN services and the commercial opportunity from doing so

Source: Analysys Mason

Challenge: supporting advanced 5G applications requires additional investment, but the revenue opportunities are fragmented and their size uncertain

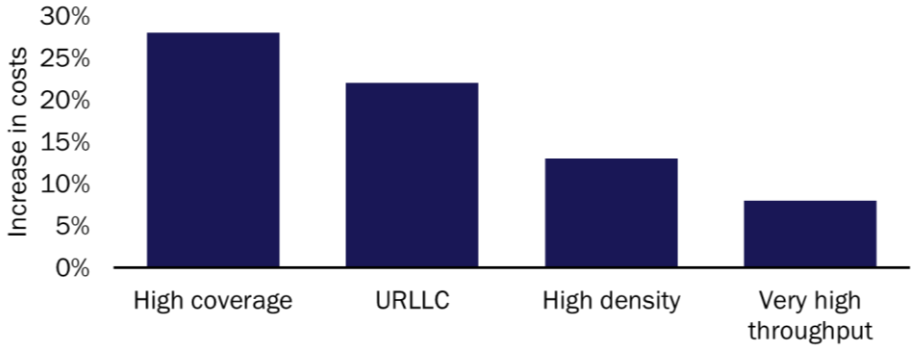
Analysys Mason's consumer and enterprise research shows that there are challenges in the 'business as usual' case for 5G, which remains focused on mobile broadband, but also uncertainties about the near-term adoption of new services, and no killer application.[1]

The three major Chinese operators have taken a lead in developing new 5G applications, but they recently reported that only 10% of these have commercial potential in the near term.[2]

Some operators will continue to focus on enhancing mobile broadband connectivity, while others will seek to move up the value stack to support the cloud-based service platforms that are enabled by the 5G core and slicing. However, our research shows about a third of operators aim to have established new revenue streams that are enabled primarily by a highly differentiated 5G RAN by 2026. This may include wholesaling advanced connectivity to slice orchestrators.

There are two key challenges to a RAN-centric model. The first is that there are many consumer and enterprise services that can be enhanced by advanced 5G connectivity, but each has different requirements and ecosystems, which reduces economies of scale for operators. The second is that advanced connectivity requires considerable additional investment, but the size of the new revenue opportunities remains unclear in most markets, and this is unlikely to change in the timeframe in which operators need to expand their revenue bases.

Figure 2. Average increase in RAN deployment costs over 10 years when supporting advanced 5G RAN capabilities compared to enhanced mobile broadband only



Source: Analysys Mason

This means that operators that invest in specific differentiators such as ultra-reliable, low-latency communications (URLLC), ubiquitous coverage or extreme density are doing so in the absence of clear and quantifiable demand.

Furthermore, such RAN-centric differentiators may significantly increase the cost of building and optimising a 5G network (by more than 70% if all the capabilities listed above are included). Even one capability such as URLLC (which is used as the main case study in this report) can add more than 20% to the cost of deploying and operating a RAN over a 10-year period. Operators' challenge is therefore to mitigate the risks of uncertain ROI while still achieving 5G differentiation.

[1] For more information, see Analysys Mason's 5G ecosystems and business model disruption in the consumer market and Spend on private LTE/5G networks will be small but an important opportunity for future IoT growth. [2] Sina (October 2021), *Key moments of 5G applications: After thousands of "model room" projects are eliminated, which scenarios are being promoted on a large scale?* Available here (in Chinese).

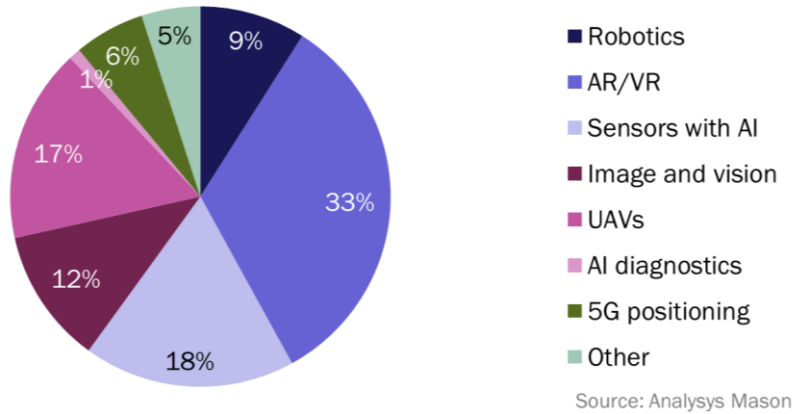
Solution: operators should invest in 5G RAN capabilities that can be differentiators in a wide range of opportunities, and that complement edge and slicing platforms

Some advanced operators will pursue new revenue and mitigate risks by adopting cloud-based RANs, service platforms and slicing. However, this will be too ambitious for most, at least in the near-to-medium term, and they must instead maximise the monetisation of their area of expertise, the RAN.

We profiled 19 operators (see slides 27–46) and found that together they are trialling or offering over 200 5G-specific applications (about 70 unique applications). The business model will lack scale and risk being unprofitable and fragmented if each of these applications has to be developed individually, with its own set of partners. Some leading operators are in the process of rationalising their long lists of 5G applications to select a manageable number to deploy and support. For example, China Telecom said in a recent filing that it had launched 5000 5G application projects, but will commercialise only 360.

The key is not to reduce the variety of applications to the extent that operators limit their opportunities, but rather to identify broad categories of applications that have common characteristics in terms of their RAN requirements. Operators can then invest in capabilities to address those RAN requirements, and enable a large number of applications in a common, scalable way. Figure 3 gives the breakdown of the 19 operators' applications by category and shows that 95% fall into just seven categories. Operators need to identify which of these categories are already demonstrating demand in some markets and also have future potential in other applications or industries. All of the categories identified in our operator and enterprise surveys will be used in many consumer and enterprise applications and can be enabled or enhanced by advanced RAN connectivity.

Figure 3: 5G use cases by category[1]



Source: Analysys Mason

Operators then need to identify the RAN capabilities that will best enable or enhance applications in these categories so that they can address a wide range of industries and applications. This mitigates the risk of investing too heavily in just one scenario before the business case is clear. It also allows operators to play to their strengths in connectivity while increasing the value of that connectivity to enterprises, partners and wholesale customers, including emerging players in network slicing.

[1] UAV stands for unmanned automated vehicle. The data is based on an analysis of the new 5G uses cases of 19 of the leading operators worldwide.

Recommendations

1

Operators should identify service categories with proven demand across multiple sectors and applications, and should learn from early movers.

There is no 'killer app' for 5G, especially in enterprise markets, which have fragmented requirements. It is important that operators identify categories of services that can apply to many sectors and applications, such as robotics and AR/VR, rather than investing too heavily in a single application. These categories should allow for clear differentiation and support at least some near-term revenue opportunities, as well as a longer roadmap.

2

Operators should prioritise investing in RAN capabilities that support use case categories that have the most operator revenue potential.

Operators must focus their investments and efforts on the RAN capabilities that enable them to differentiate in their chosen application categories. Many capabilities, such as ultra-low latency, will be improved by the 5G standards from 3GPP Releases 15, 16 and 17. However, much greater improvements can be achieved by investing in technology and optimisation that goes well beyond the standards in terms of their impact on RAN performance.

3

Operators should explore multiple ways to monetise a highly differentiated RAN, including using consumer, enterprise and wholesale models.

Operators must maximise the return on their investments by building channels and partnerships to reach a large number of industries and value chains. This will enable them to derive new revenue from a wide range of users and to mitigate the risk of investing heavily in RAN differentiation and new capabilities.

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Caroline Gabriel (Research Director) leads Analysys Mason's *Networks* research practice, as well as leading many 5G-related research activities across multiple programmes. She is responsible for building and running Analysys Mason's unique research base of mobile and converged operators worldwide. She works directly with Analysys Mason's research clients to advise them on wireless network trends and market developments. She has been engaged in technology analysis, research and consulting for 30 years, and has focused entirely on mobile and wireless since 2002. Her focus is on critical issues and trends related to mobile and wireless infrastructure, particularly operator deployment intentions for 4G, 5G, cloud-RAN and other technologies. She has led research and consulting projects with a wide range of clients, including mobile infrastructure vendors, large and start-up operators, regulators, trade bodies, government agencies and financial institutions.

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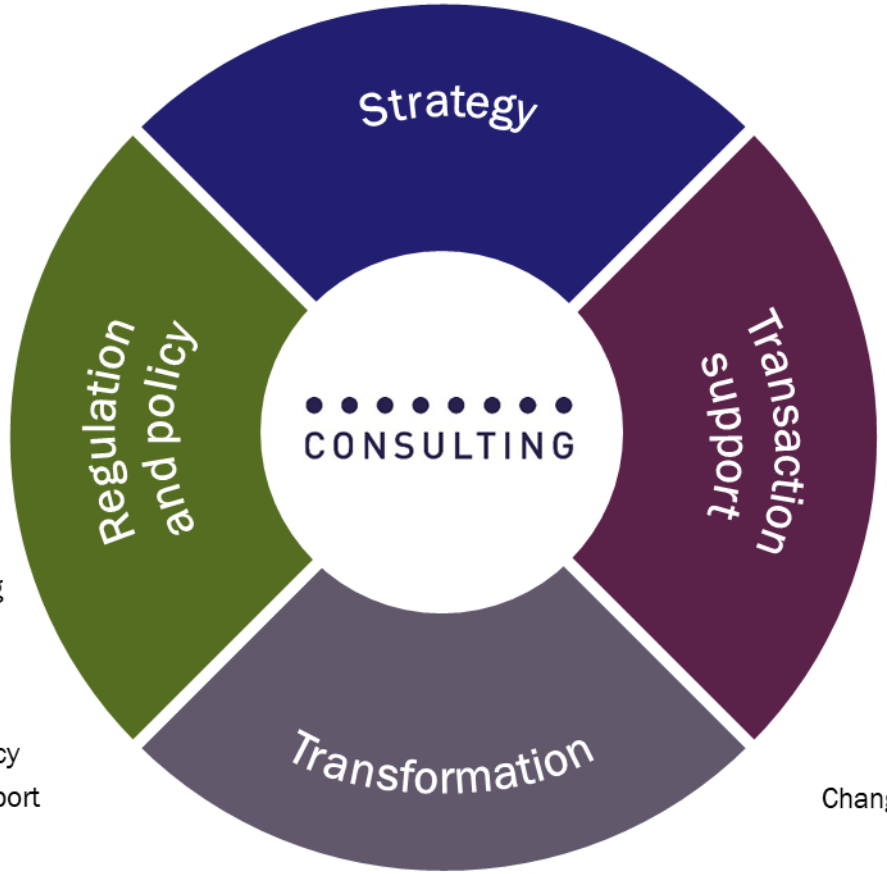

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