OPPORTUNITIES AND CHALLENGES OF 5G NEW CALLING

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Executive summary

The objective of the emerging 5G New Calling is to transform the user experience of voice calls. Voice is the longest-established mobile service and remains crucial to operator business models, as well as a widening range of consumer and business applications. User expectations of the quality of mobile voice continue to rise and this drives the need for native voice services such as 5G New Calling.

With 5G New Calling a call can be carried over a 4G/5G network. The high bandwidth and low latency of a 5G network provides users with high-definition and immersive audio and video communications, compared with a 4G network. User experience is enhanced because 5G New Calling uses 3GPP defined and standardized data channels that are established by the IP multimedia subsystem (IMS). The IMS data channels enable advanced interactivity features such as rich media displays, augmented reality (AR)/virtual reality (VR), video clips, etc.

5G New Calling enhances the user experience, facilitates the adoption of new services and crucially provides unique added-value features, compared with those of over-the-top (OTT) applications which have significantly eroded mobile voice revenue. Overall, 5G New Calling provides operators with the opportunity to deliver a better user experience, and so generate additional revenue and reduce churn rate.

Pilot use cases for 5G New Calling include real-time translation, customer support, telemarketing, and remote home assistance/damage estimation/repair installation. Most recently, China Mobile Jiangsu, China Mobile Zhejiang and China Mobile Guangdong engaged customers to test out several 5G New Calling features in time for the 2023 Chinese New Year, including using a personal avatar, real-time translation, emojis and filters. Filters refer to the imposition of virtual images such as glasses on the user.

Enterprises will be a key target for the advanced communications enabled by 5G New Calling. Analysys Mason conducted surveys in 2022 related to a key use case for 5G New Calling, customer support operations. The surveys addressed 501 private and public sector organisations and 4000 consumers in four countries (France, Germany, Spain and the UK) and revealed a significant appetite for customer support services that relied on advanced multimedia communications. Key survey findings will be discussed in chapters 3.1 and 3.2.

However, momentum behind 5G New Calling risks being limited due to the limited success of VoLTE (voice over LTE) and strong attractiveness of OTT applications. It will be important to convince consumers that 5G New Calling has many advantages over OTT applications, which previous technologies lacked. For example, 5G New Calling is capable of providing real-time interactions, and deploying new services and features which require high bandwidth and low latency.

5G New Calling will require a broad ecosystem to gain widespread awareness and adoption, and to develop compatible devices. To achieve wide adoption, operators need to raise customer awareness of the benefits of this service, and collaborate with vendors to accelerate the development of compatible devices. Vendors can help to boost confidence and adoption by demonstrating successful use cases with tangible revenue-generating potential to operators. Encouraging developers to participate in the ecosystem via an open application programming interface (API) will help to broaden the range of services available and to prevent fragmentation.

2. The market context

The objective of the emerging 5G New Calling is to transform the user experience of voice calls.

Revenue for cellular voice and messaging services has been significantly affected by the introduction of OTT applications: mobile voice revenue has dropped by over 70% worldwide since 2008 (from approximately USD557 billion to USD167 billion).[1] Operators still offer voice services, but these services do not contribute to revenue growth and operators have been slow to implement 4G VoLTE networks.

Key factors for a 5G New Calling ecosystem include international standards, carrier support strategies, network construction plans, terminal support, access to a wide range of applications and the implementation of various appealing marketing campaigns to stimulate user demand. Amongst this the first step for operators to guide the industry successfully and effectively is securing large scale terminal support. Further, industry guidance requires adequate mobilization which is dependent on consensus being reached amongst all industry sectors. Cost investments and gathering the support of operators, network manufacturers and terminal manufacturers in line with international and industry standards are critical to achieving this.

The poor competitive performance of services such as VoLTE against OTT applications is likely to be a factor limiting operator enthusiasm for 5G New Calling. However, 5G New Calling is different from typical cellular voice and messaging services. The high bandwidth and low latency of a 5G network provides users with high-definition and immersive audio and video communications, while IMS data channels enable advanced interactivity features such as enhanced interactivity and rich content. Functionality is installed on the mobile device. As such, 5G New Calling enhances the user experience and supports the adoption of new services such as AR. It must be noted that advanced 5G New Calling features with superior experience such as AR will only be enabled by a 5G SA network. 5G New Calling's provision of a better calling experience may encourage its take-up over other services such as voice over internet protocol (VoIP), generate revenue via value-added services (VAS) and contribute to lower churn rates for operators.

[1] Analysys Mason, *DataHub* (2023)

3. The end-user market opportunity for 5G New Calling

WhatsApp and Facebook are the most popular social media communication services and are used by more than 50% of respondents in France, Germany, Spain and the UK.

3.1 End-user behaviour in developed markets

Consumers in developed markets prefer to use OTT applications for communication. According to Analysys Mason's 2022 consumer survey (Figure 3.1), WhatsApp and Facebook are the most popular social media communication services and are used by more than 50% of respondents in France, Germany, Spain and the UK.[2]

5G New Calling aims to combine many of the benefits of traditional forms of communication (voice calls) with the richer feature set that consumers now expect from their use of OTT applications such as emojis.

Figure 3.1: OTT communication and social media application penetration, by country, 2022

Source: Analysys Mason
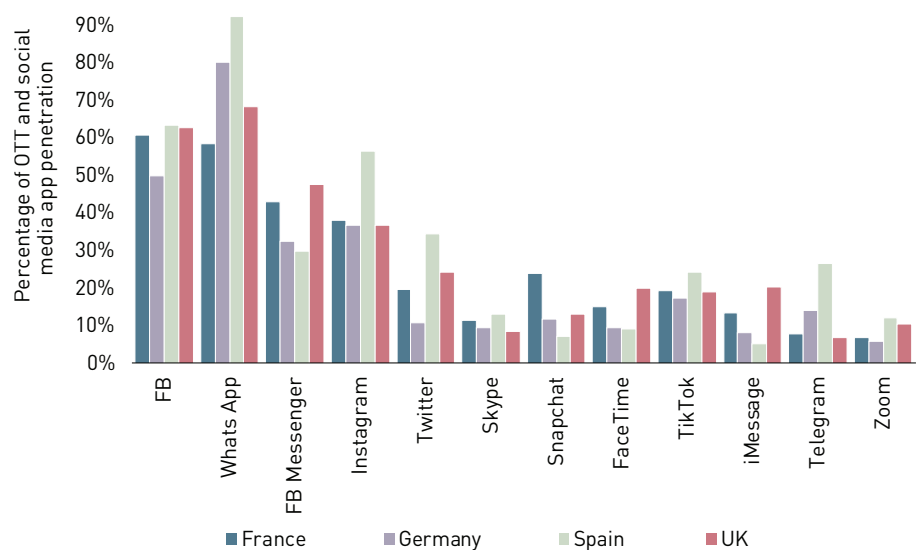
[2] See Analysys Mason's *Consumer survey* (2022) (*n* = 1000 per country).

OTT communication applications replace traditional voice calls and messages, but they also have more advanced communication features (voice messages, emojis, location sharing, etc.). For example, video calls are now almost as popular as free voice calls (Figure 3.2). 5G New Calling caters to this demand for advanced communication by supporting video calls and surpassing the feature sets offered by OTT applications.

Figure 3.2: Penetration of the most used features on OTT communication and social networking applications, by country, 2022

Source: Analysys Mason

3.2 Enterprises' appetite for 5G New Calling

Case study: Banco Itaú Unibanco

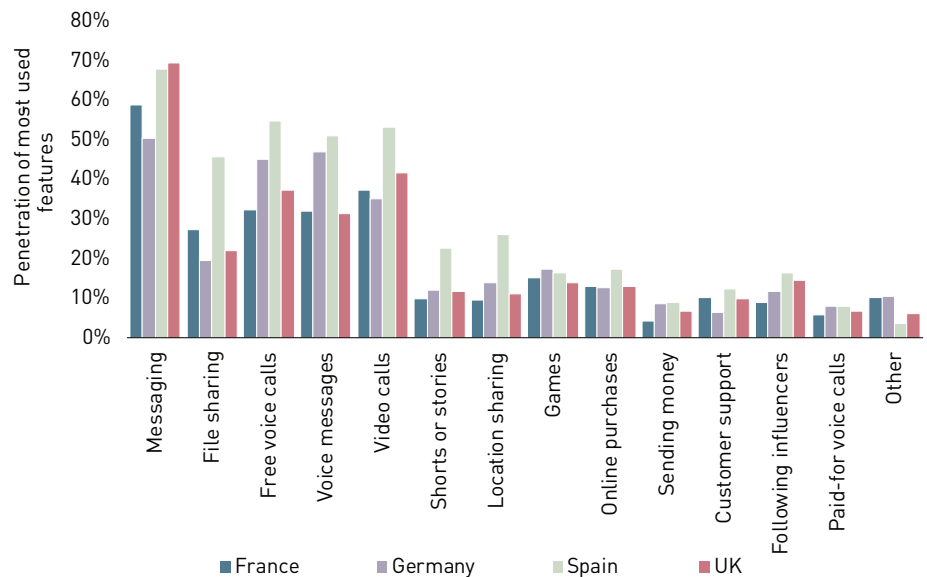Banco Itaú Unibanco S.A. is the largest private sector bank in Brazil (and in Latin America) with 56 million customers. The value of its assets exceeded BRL2 trillion (USD380 billion) at the end of 2021.

It currently uses a wide range of customer engagement channels including email, social media, web chat, WhatsApp, phone calls and face-to-face interactions in its physical bank branches. Phone calls to Itaú's contact centre remain the most-used channel. Itaú currently employs around 20 000 agents in its contact centres to resolve incoming issues and to carry out marketing campaigns.

Itaú has already introduced automation in the form of self-service portals on its smartphone applications, including app Itaú (which targets individual customers) and íon (investment products), which together are used by approximately 17 million customers each month. Self-service channels are a fraction of the cost of live agents per customer session and have no capacity constraints in terms of handling incoming traffic. However, the applications cannot address all the issues encountered by customers that reach out to the contact centre expecting issues to be resolved on a call. Furthermore, contact centre agents do not have access to a complete picture of the customer journey; rather, they only have access to a restricted view of the client's

Self-service channels are a fraction of the cost of live agents per customer session and have no capacity constraints in terms of handling incoming traffic.
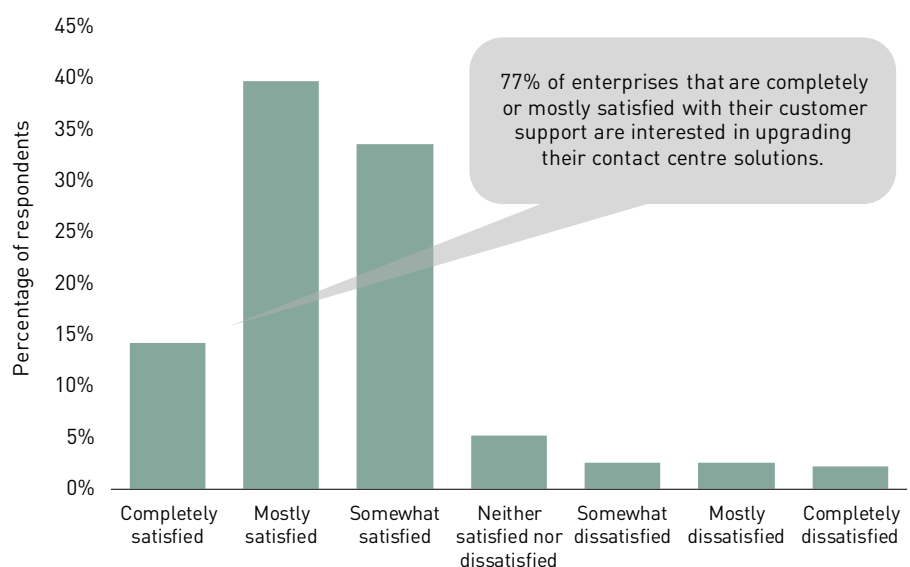
> Several real-estate companies in Sweden have stated that a unified network with one contact point is the only relevant option for indoor infrastructure, even if multiple MNOs are interested in the location.

immediate issue. For instance, for customers enquiring about banking services, the live agent does not know how long the customer has been with the bank, which products the client has either purchased or expressed an interest in, or other issues that they may have raised on previous calls. Consequently, despite a moderately high level of adoption of self-service portals, Itaú still faces the challenge of improving its first-call resolution rate.

Analysys Mason conducted an enterprise survey of 501 private and public sector organisations in July 2022 in four countries (France, Germany, Spain and the UK) to get their views about operators' contact centre/customer support solutions. The survey focused on organisations in the finance/ insurance, healthcare and retail verticals. The survey shows that only 54% of businesses were mostly or completely satisfied with their current customer operations, which suggests that there is room for improvement (Figure 3.3). In particular, enterprises that indicated that they were completely or mostly satisfied are also extremely or very interested in upgrading their contact centre solutions (77% of a subset of 270 respondents). This indicates that enterprises recognise the benefits of efficient customer support operations and want to invest further to improve customer experience.

Fraud prevention is one prominent issue that cannot be automated in the bank's smartphone application. Customers must ring up the contact centre to talk with an agent to certify genuine transactions. It would be more-efficient to introduce a biometric verification that can be initiated within the smartphone application or is natively accessible from the voice call made to the contact centre. This would also create a more-immersive customer experience. Over the next 2 to 3 years, Itaú plans to increase automation to improve the handling of customer enquiries and issues, to mitigate or eliminate the 'broken' multi-channel experience, and to increase the number of offers available and sold through digital channels. These efforts will ultimately result in a higher Net Promoter Score (NPS), which is currently 78.

Figure 3.3: *Percentage of organisations by satisfaction level with current customer support operations, 2022*

> 77% of enterprises that are completely or mostly satisfied with their customer support are interested in upgrading their contact centre solutions.

Source: Analysys Mason

Enterprises' two most-cited reasons for upgrading their customer support operations were to provide a quicker time-to-resolution and shorter wait times.

Enterprises' two most-cited reasons for upgrading their customer support operations were to provide a quicker time-to-resolution and shorter wait times (Figure 3.4). A quicker-time-to-resolution was considered to be the most important driver by those businesses that are satisfied with their current customer support solutions.

Figure 3.4: Percentage of organisations by drivers to upgrade their customer support operations, 2022
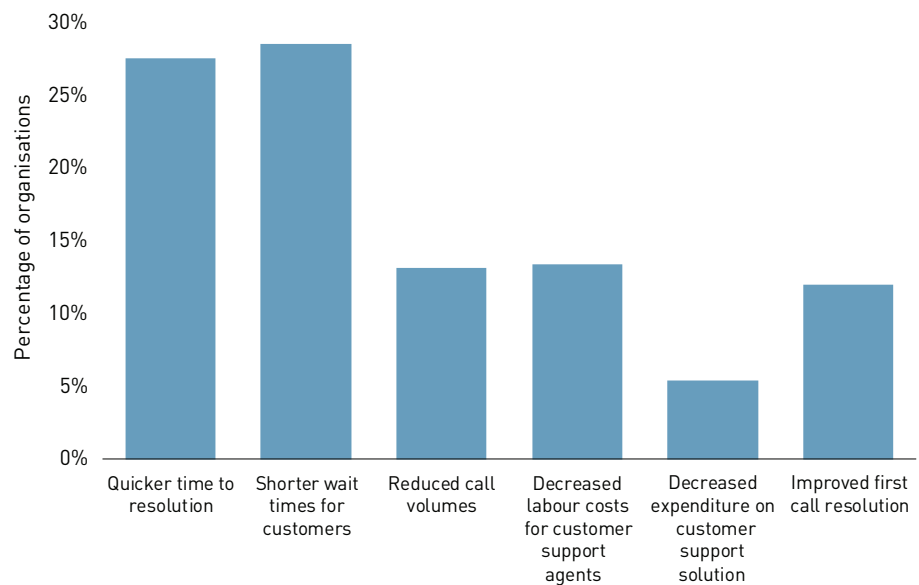
Source: Analysys Mason

The following features for customer support operations were cited by enterprises as either important or very important: enterprise caller identification (ID), designated support agents, a smart menu, and payment and video calls (Figure 3.5). In particular, enterprise caller ID and smart menus are among the five most-essential customer support features across France, Germany, Spain and the UK. Importantly, all are available through 5G New Calling.

Figure 3.5: Percentage of organisations by level of importance of the customer support operations features, 2022
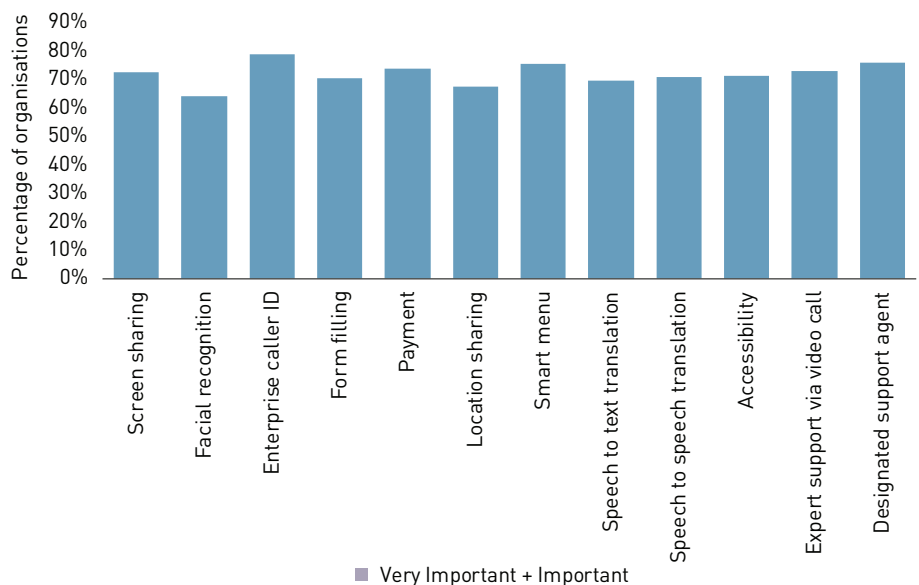
Source: Analysys Mason

Over half of all surveyed enterprises had begun to implement or were planning to implement enterprise caller ID, designated support agents, a smart menu, payment and video calls within their customer support operations (Figure 3.6). As such, 5G New Calling is likely to be an attractive means of implementing these features.
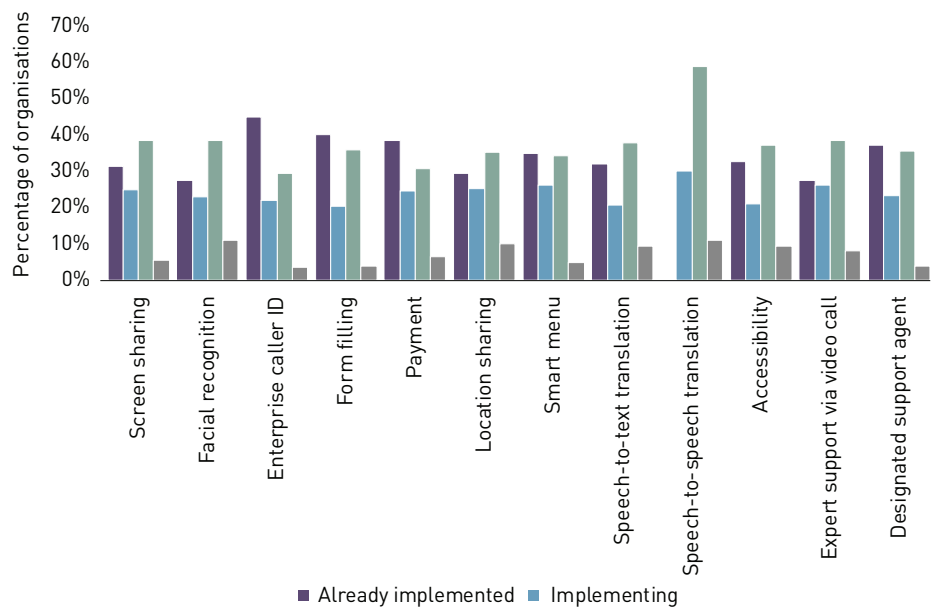
Figure 3.6: Percentage of organisations by implementation status of customer support operations features, 2022

Source: Analysys Mason

The commercial model for 5G New Calling can incorporate many possible charging methods such as charging by service duration

3.3 Business models and case studies

The commercial model for 5G New Calling can incorporate many possible charging methods such as charging by service duration (that is, minutes) or bundling 5G New Calling within existing monthly plans, so that no data fees are applied. However, 5G New Calling is currently only in trial phases, and so its tariff model is still being explored, with no confirmed long-term model. One potential commercial model of this service for consumers may involve additional features such as translation being charged separately and for enterprise customers a base fee, an additional features fee and a usage fee.

Pilot use cases for 5G New Calling include real-time translation, customer support, telemarketing and remote home assistance/damage estimation/ repair installation. Most recently, China Mobile Jiangsu, China Mobile Zhejiang and China Mobile Guangdong engaged customers to test out several 5G New Calling features in time for the 2023 Chinese New Year, including:

- the ability to send a personal avatar to another caller on a voice call to enhance human interactions and connection.
- video calls, which provide consumers and enterprises with more-convenient services such as customer support.
- real-time translation (speech-to-text/speech-to-speech), which enables barrier-free communication and increasing accessibility.
- the use of virtual avatars, emojis and filters to convey emotional significance.

4. 5G New Calling faces several challenges that will affect its wider

China Mobile is enhancing the customer experience for its video call services by introducing features such as rich media displays which do not require any modifications to end-user devices.

4.1 Providers of 5G New Calling should learn the lessons of RCS

All operators in China had launched commercial trials of 5G New Messaging (also known as rich communication services (RCS) internationally) as of January 2022. In addition, China Mobile has begun work on a certified service provider platform, while China Unicom and China Telecom are still in the process of building their platform as part of deploying a network-wide strategy. At the end of 2022, China Mobile accounted for the highest number of 5G New Messages sent in China (approximately 17.5 billion).

For the construction of a 5G New Calling ecosystem, key factors are international standards, carrier support strategies, network construction plans, terminal support, multi-application richness and the implementation of various publicity methods (including education campaigns) to attract users. Securing large scale terminal support is especially a strong and effective way for operators to guide the industry. Further, industry guidance requires adequate mobilization which is dependent on consensus being reached amongst all industry sectors. As such, sufficient cost investments and gathering the support of operators, network manufacturers and terminal manufacturers in line with international standards and industry standards are critical aspects.

China Mobile is enhancing the customer experience for its video call services by introducing features such as rich media displays which do not require any modifications to end-user devices. The operator is now looking to gain further support from OEMs by expanding market scale and securing high demand from end users (i.e. consumers) for 5G New Calling services. Overall, the rollout of 5G New Calling is a two-phase process.

- **Phase 1.** With the introduction of a 5G New Calling network architecture based on existing terminal capabilities, intelligent applications based on video calls can be provided.

- **Phase 2.** With the introduction of terminals supporting the data channel function, intelligent call services capable of real-time interactive features can be provided.

4.2 5G New Calling could help operators to create a wider ecosystem

5G New Calling offers greater capabilities for operators to use, to innovate with and create a wider ecosystem. This provides operators with a greater incentive to invest in, and deploy, 5G New Calling. 5G New Calling allows operators to extrapolate greater value from the act of calling. Innovative features enabled by 5G New Calling include:

- for consumers, high-definition audio and video calls, emojis/avatars/filters and speech-to-text/speech-to-speech real-time translation using AI and extended reality technologies, as well as content sharing.
- for enterprises, video-enabled customer support, visual interactive voice responses and video-based remote support.

In comparison with RCS, 5G New Calling can be used to provide real-time interactions, deploy new services that rely on high bandwidth and low latency and to create more-interactive communications. Some of the differences between 5G New Calling and RCS are outlined below.

- 5G New Calling uses a flexible protocol stack stream control transmission protocol (SCTP) via IMS architecture to provide real-time communication whereas RCS uses transmission control protocol (TCP).
- 5G New Calling uses a 5G QoS Identifier (5QI) via IMS architecture to support services that demand a high quality of service (QoS), such as AR; RCS is only suitable for messaging.
- Third parties are developing servers for devices and networks developed with short service cycles, while RCS development has many restrictions and a long cycle.
- 5G New Calling has unmatched key features that RCS does not, such as enhanced video calls (Figure 4.1).

5G New Calling offers greater capabilities for operators to use, to innovate with and create a wider ecosystem.

Figure 4.1: *A comparison of 5G New Calling and RCS*

	5G New Calling	5G New Messaging
Primary communication	Voice, video, other multimedia	Message
Real-time support	Yes	No
Dedicated QCI[3]	Yes	No
Features	Sport streaming, AR tracking, remote assistance, screen sharing, third-party ID, calling, translation, speech-to-text/speech-to-speech translation, enhanced emojis/filters and third-party applications	Booking, customer service enquiries and file sharing

Source: Analysys Mason

[3] Refers to a quality of service class identifier

4.3 Advantages of 5G New Calling over OTT applications

5G New Calling offers more innovative features than RCS or the advanced features included in OTT applications (Figure 4.2). For example, 5G New Calling:

- seamlessly connects different interactive features to the user's 5G New Calling platform.
- makes it easier for users to engage with multiple applications while on a call, allowing them to undertake more-complex tasks and to have a smoother user experience.
- includes services that are fully integrated within the existing phone application, which allows multiple services to be accessed more simply.
- provides end-to-end QoS assurance with a service level agreement (SLA) of more than 99% – in line with traditional voice calling.
- includes greater security through its real-name authentication and supervision levels.

5G New Calling offers more innovative features than RCS or the advanced features included in OTT applications.

Figure 4.2: A comparison of RCS, OTT and 5G New Calling

Channel	Reach	Security	Features
RCS	- Largely dependent on Android ecosystem - Supported by SMS fallback	- All senders need to be registered and verified by the RCS service provider	- Competitive feature set, but lacks the agility of messaging applications - Potential to customise on top of standard profile features
OTT applications	- Some applications have high penetration in many countries - Fragmentation remains common	- Authentication supported to varying degrees	- Varies considerably; generally very strong feature set
5G New Calling	- Currently only available in China and limited coverage in the USA	- Strong security through real-time authentication and high content supervision levels	- Very strong feature set that includes features that are not available for OTT applications or RCS

Source: Analysys Mason

5. The evolution of 5G New Calling

The IMS data channel is a key component of 5G New Calling. It allows parties (such as operators and end users) to upload and download content in real time.

5.1 Key 5G New Calling components and their evolution

The necessary components for 5G New Calling such as 5G networks and the IMS data channel now exist alongside clearly formulated standards. This will make it easier, and more compelling, for operators to adopt this service.

The IMS data channel is a key component of 5G New Calling. It allows parties (such as operators and end users) to upload and download content in real time. The relevant IMS standard, that is 3GPP TS 26.114, has been last updated by 3GPP in January 2023.[4] It means that 5G New Calling can expand the user experience beyond one and two-dimensional limits to three-dimensional, immersive experiences that include interactive communication. 5G New Calling can also enable new services and device types.

The applications of 5G New Calling include real-time translation (speech-to-text and speech-to-speech), visual interactive smart menus, remote collaboration/control and AR as well as content sharing. The operating environment of 5G New Calling that enables these features is comprised of three layers:

- the interface, which includes APIs for the mini programme/application and dialler application.
- function management, which includes a service management module (initiation), a mini-application management module (for lifecycle management) and a supporting function module (for data storage).
- capability adaptation, which includes a network capability adaptation module (for example, IMS DC API encapsulation) and a local computing capability adaptation model (for example, use of a camera).

[4] 3GPP TS 26.114 IP Multimedia Subsystem (IMS); Multimedia Telephony; Media handling and interaction (Release 16)

5.2 Expanding and enriching the 5G New Calling ecosystem

Cultivating a vibrant ecosystem is essential for the widespread adoption of 5G New Calling. Key ways to expand and enrich the 5G New Calling ecosystem include raising awareness, collaborating with vendors and encouraging ecosystem collaboration/expansion.

Awareness needs to be raised around 5G New Calling to generate momentum for its adoption among operators, which will be led by early adopters and service providers of 5G New Calling. This can be achieved by promoting industry success stories from early adopters, education campaigns and by building awareness of 5G New Calling among operators via targeted marketing and in new forums. Promotion and education around the maturity of 5G New Calling use cases should also be shared by early adopters. Service providers need to share requirements and technical standards to show operators and other value chain players that the service is mature, safe and reliable, and that there is a clear user proposition distinct from VoLTE. Furthermore, uncertainties about the return on investment (ROI) of new services are a key barrier to operator adoption. However, if early adopters and service providers can demonstrate that they have achieved a clear ROI, this would help to encourage other operators to adopt 5G New Calling.

Collaboration with vendors is necessary for the creation of 5G New Calling-enabled devices and its wider adoption. Building scale or showing that strong market demand exists for the service can encourage collaboration between operating system vendors and chipset manufacturers. This will help to motivate OEMs to increase the proportion of 5G New Calling-enabled devices by including it not only as a standard featured but also as a differentiating feature in all new devices.

Finally, ecosystem collaboration is essential for the stability and growth of a 5G New Calling ecosystem. Providing easy access to developers to industry and APIs that work across the networks of different operators will help to support the continued development of differentiated applications, which can deliver high value.

Awareness needs to be raised around 5G New Calling to generate momentum for its adoption among operators, which will be led by early adopters and service providers of 5G New Calling.

6. A case study in 5G New Calling from China Mobile

China Mobile aims to use 5G New Calling to create a differentiated service experience that appeals to consumer and enterprise customers.

Context

China Mobile has been exploring ways to revitalise its voice services by delivering a richer and more-engaging call service to its end users. With the nationwide roll-out of 5G, AI and AR, 5G New Calling is envisaged as the solution to this challenge, and is expected to slow down the decline in minutes of use (MOU) and to generate revenue through value-added services. China Mobile is currently rolling out a large-scale 5G New Calling proof of concept (PoC). Following this, it will co-operate with relevant international standards organisations (such as 3GPP) to operationalise its services.

Solution

China Mobile aims to use 5G New Calling to create a differentiated service experience that appeals to consumer and enterprise customers. For example, it wants consumer calls to become more interesting and fun by implementing features such as emojis, while increasing the efficiency of internal/external communications for enterprise customers. The 5G New Calling features that China Mobile plans to implement (some of which have trialled on a substantial scale) include:

- real-time translation for speech-to-text/speech-to-speech, supporting communication across languages.
- enhanced filters and emojis, which can make calls more fun.
- video calls to interact visually with clients, family and others.
- screen sharing to improve remote collaboration.
- an interactive menu.
- content sharing (such as pictures of files).
- AI services such as voice recognition and chatbots (such as interactive voice response), which can answer customer queries/complaints or redirect them to the appropriate person.
- AR services to support insurance investigations as one example and to provide remote guidance/collaboration.

Aspirations

China Mobile is relying on its large-scale PoC to understand how the network handles 5G New Calling and to raise awareness among its customer base of its benefits. It envisions a paradigm shift ushered in by 5G New Calling where voice traffic serves as the foundation of a platform economy. In the new paradigm, themed filters and AI toolsets (among other applications from a vibrant ecosystem of developers) will not only improve the user experience of consumers and enterprise, but also generate revenue for operators and developers.

7. Recommendations

The ecosystem must attract a wide range of developers to broaden the scope of available 5G New Calling applications, especially to enterprises

Our recommendations for the evolution of 5G New Calling focus on the business case and ecosystem.

7.1 Business case recommendations

- Operators should define a new user proposition for 5G New Calling, especially for business users, that is clearly distinct from that for VoLTE.

- This should focus on unique benefits and new applications that have a tangible business impact, and that cannot be achieved using existing technologies or OTT approaches. The proposition should be enterprise-centric and focus on leveraging capabilities that are unique to telecoms operators' networks, such as advanced quality of experience (QoE) control, and are not replicable in OTT applications.

- A clear investment, service and ROI case must be defined to encourage other operators to assess the benefits of 5G New Calling. Uncertainty about ROI is one of the most significant barriers when considering a new service.

7.2 Ecosystem recommendations

- The ecosystem must attract a wide range of developers to broaden the scope of available 5G New Calling applications, especially to enterprises. It will rely on operators supporting open APIs that enable an application to work across networks of different operators, allowing for cross-network communications and expanding the developers' addressable market. It is essential that operators support, and contribute to, API initiatives created by international groups such as GSMA, as without mass adoption of open APIs, the ecosystem will be fragmented.

- Supporters of 5G New Calling must leverage their market power to drive confidence in the device ecosystem by providing strong proof points to encourage chipset and device makers to support the service. High-profile devices are important drivers of adoption.

- Vendors and early adopters should boost confidence and credibility among operators and developers by encouraging collaboration. Forums in which operators can share technical and commercial experiences can accelerate take-up and lower the barriers to deployment.

8. About the authors

Caroline Gabriel (Research Director).

Caroline leads Analysys Mason's Networks research practice, as well as leading many 5G-related research activities across multiple programmes including Next-Generation Wireless Networks and Transport Network Strategies. 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, virtualised RAN, end-to-end open networks 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. Prior to joining Analysys Mason, Caroline co-founded Rethink Technology Research in 2002. Prior to that, she held various executive positions at VNU Business Publishing (then Europe's largest producer of technology-related B2B reports and publications). She holds an MA from the University of Oxford.

Aisha Iqbal (Consultant).

Aisha has extensive experience in developing and applying robust methodologies for data collection and benchmarking. She has worked on strategic advisory projects in a number of different areas, including enterprise software, fixed broadband, 5G and IoT, and has worked with both telecoms operators and technology vendors. Prior to joining Analysys Mason, Aisha was an Analyst at the UK Civil Service and at a local authority. Aisha holds a MA in history from the University of Exeter and a BA in history from the University of Oxford.

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