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ANALYSYS MASON

QUARTERLY

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Towercos should prepare for contract renegotiation

Decisions to shutdown 2G/3G need to be commercially driven

Bioeconomy digitalisation opportunities for Operators and ICT

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A positive future for e-pharmacies in India

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Introduction

Welcome to the fourth Analysys Mason Quarterly for 2019.

In our first article, Tom Rebbeck presents the findings of a recent Analysys Mason survey. He highlights that the cyber-security market for small and medium-sized businesses (SMBs) is rapidly growing and estimates that enterprises with fewer than 1000 employees will spend around USD50 billion on security solutions in 2019.

Bram Moerman
CEO Analysys Mason

Vendors of cyber-security solutions are not serving smaller businesses well, but should see this large, growing and underserved market as an opportunity.

Alessandro Ravagnolo's article recommends action as we are on the verge of a wave of contract renegotiations between towercos and their MNO customers. Towercos will need a clear negotiation strategy and Analysys Mason's proposal is not to wait for the natural expiration of the contracts but to start preparing for the renegotiations in advance.

Mobile operators need to consider the trade-off between closing a legacy 2G or 3G network to free up spectrum for 4G/5G and the risk of losing subscribers that are reliant on legacy networks for mobile services. Dion Teo considers the decisions that need to be taken and highlights that legacy network shutdowns need to be commercially driven and must balance the benefits and risks.

The bioeconomy is one of the EU's largest and most important sectors. It has an annual turnover of EUR2 trillion and employs 18 million people. In our fourth article, Maria Tunberg looks at how the bioeconomy is undergoing a rapid digital transformation, but it has only recently begun to catch the attention of operators and ICT providers. Analysys Mason is co-ordinating a project on behalf of the Nordic Council of Ministers with the aim of facilitating the digital transformation of the Nordic bioeconomy.

Ian Adkins article explains how the utilities industry faces some significant challenges associated with the delivery of resilient and cost-effective utilities networks. There is a shared view within the industry that access to dedicated radio spectrum will be needed to meet these challenges. However, not all stakeholders are aligned and are adopting differing approaches to spectrum allocation. Analysys Mason believes that achieving a national allocation of dedicated spectrum for utilities in any country will need compelling technical and commercial justification.

In our final article, Rohan Dhamija assesses the state of the e-pharmacy industry in India, the drivers of its growth and its future prospects. Rohan explains that the sector is at the stage that the e-commerce and online food delivery sectors were at 5 and 2 years ago respectively. Rohan explains how the lessons from these sectors will be invaluable as the e-pharmacy market in India seeks to build on the increasing number of investments and the favourable regulatory changes.

We welcome the opportunity to discuss your views on these and any other key industry topics. I look forward to hearing from you.

Business survey 2019: almost 25% of small businesses feel that their cyber-security protection is inadequate

Tom Rebbeck, Research Director, Research

The cyber-security market for micro, small and medium-sized businesses (SMBs) is large, and rapidly growing. Analysys Mason estimates that enterprises with fewer than 1000 employees will spend around USD50 billion on security solutions in 2019 and that this will grow at an average rate of 13% between 2019 and 2024.

However, the market may not achieve this growth unless security vendors do a better job of servicing it. Vendors that want to succeed in the SMB market need to do more to explain the security risks that small companies face and increase awareness of products that can help these companies mitigate such risks.

Our recent survey of around 3000 businesses worldwide shows that the smaller a business, the larger the relative impact of a cyber attack. Despite this, small companies are not well served by security vendors.

Cyber attacks have a relatively larger impact on smaller businesses

High-profile cyber attacks on large businesses such as British Airways or Equifax may make headlines, but rarely have severe long-term consequences for the business. In contrast, a cyber attack can threaten the existence of a small business. According to our survey, the average cost per employee of all attacks in the past 12 months was over USD400 for a micro business, compared to costs of USD25 for a large business (see Figure 1). (All data is self-reported and should be treated with caution.)

Security incidents are also relatively common for smaller companies. In our survey, 32% of micro businesses and 39% of small businesses reported that they have experienced a security-related incident in the last 12 months. These figures are lower than for larger companies (61% of large companies had some sort of incident in the last 12 months), but given that larger companies have more of everything (people, PCs, servers etc.), this difference is unsurprising. Again, if we compare the data on a per employee basis, smaller companies are more vulnerable than larger ones.

This vulnerability is reflected in how smaller companies feel about their level of protection. Only 77% of micro businesses said that they felt fairly or extremely well-protected against cyber-security attacks and threats from external parties (compared to 90% for large businesses). The remaining 23% of micro businesses felt either somewhat or not satisfactorily protected, compared with just 10% of large businesses.

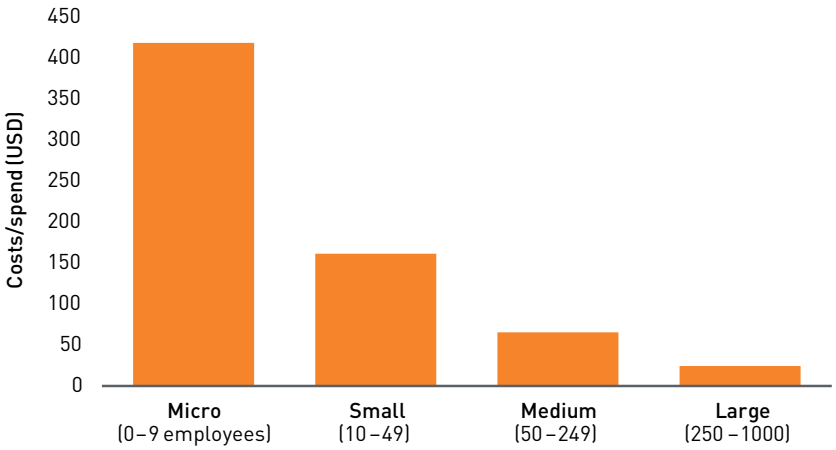

FIGURE 1: ESTIMATED COST OF SECURITY-RELATED INCIDENTS EXPERIENCED IN THE LAST 12 MONTHS, BY BUSINESS SIZE, PER EMPLOYEE[1] [SOURCE: ANALYSYS MASON, 2019]

Security vendors are not serving smaller businesses well

Few micro or small businesses have dedicated security personnel. Security is often the responsibility of an office manager, or even of the company owner. This makes it more difficult for security vendors to target the right person than when targeting larger organisations. However, this should not be mistaken for a lack of interest in security; our survey shows that the security priorities of smaller businesses (for example, protecting customers' data, ensuring business continuity) are almost identical to those of larger organisations.

The lack of specialist security staff and limited budgets are considered to be barriers to the development of security capabilities by surveyed businesses of all sizes. However, smaller businesses were more likely than larger ones to cite the lack of awareness of new security vendors and their products as a challenge (see Figure 2). Large and medium-sized businesses identified the lack of awareness of new security vendors and their solutions as the least of their challenges out a list of 12 options.

Vendors should see this large, growing and underserved market as an opportunity

Vendors might regard smaller businesses as unattractive business propositions for many reasons: spend per company will be low relative to larger organisations; prospects can be hard to find and expensive to serve; price may be more important than technical capabilities in decision making, as may ease of use.

For vendors that are willing to tackle this market though, these negatives create an opportunity. As our survey reveals, even the smallest enterprises have expressed interest and increasing awareness of the need to improve security. A security breach is likely to cost at least a few thousand dollars, and for a small business with tight cash flows, that amount could represent the difference between surviving or not. Despite this (or perhaps because of it), smaller enterprises are less likely to feel well-protected than their larger counterparts.

Vendors that want to sell to micro and small businesses need to:

- highlight the impact of a security breach
- show how their products can help to mitigate the risks
- make it easy for businesses to adopt their services.

Vendors should experiment with self-serve options, freemium models and free trials that can be used to demonstrate the threats that businesses are facing.

[1] Questions: "Has your company experienced any of the following IT security-related events in the last 12 months?"and to companies that suffered a security-related incident "How much would you estimate that the incident(s) cost your company (including direct losses as well as costs incurred to recover from the breach(es) and restore the lost information, legal costs to your business, and costs of repairing your business' reputation)?". n = 2983.

[2] Question: "Which of the following are challenges to your company having a highly effective cyber-security capability?". n = 2983.

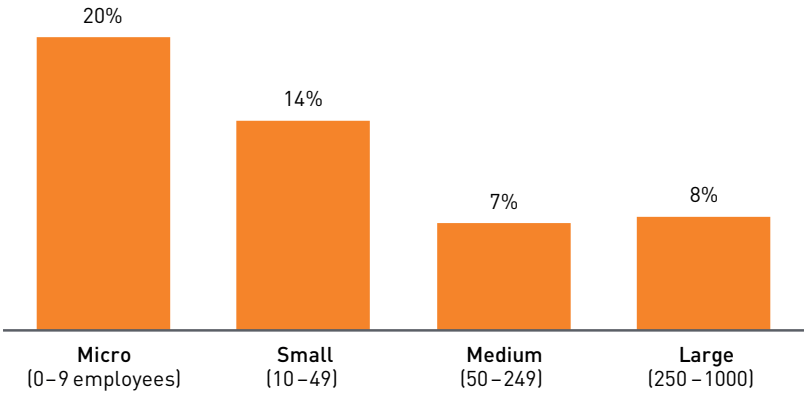

FIGURE 2: PERCENTAGE OF BUSINESSES THAT CITED THE LACK OF AWARENESS OF SECURITY VENDORS AND THEIR PRODUCTS AS A CHALLENGE[2] [SOURCE: ANALYSYS MASON, 2019]

Questions?
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The time for contract renegotiation is upon us and towercos should prepare

Alessandro Ravagnolo, Principal, Consulting

We are on the verge of a wave of contract renegotiations between towercos and their MNO customers

Several contracts regulating the relationship between towercos and their mobile network operator (MNO) customers are expected to expire in the next five years. Analysys Mason's suggestion to towercos is not to wait for the natural expiration of the contracts but to start preparing for the renegotiations in advance.

The relationship between towercos and MNOs is regulated through master service agreements (MSAs) or master lease agreements (MLAs) that typically have a duration of ten years, although longer contracts have also been noted.

The first sale-and-leaseback (SLB) deals outside the USA took place in the late 2000s and early 2010s (see Figure 1). Co-location agreements with third-party MNOs may have been signed by the towerco shortly after the acquisition of a portfolio.

Old contracts are unlikely to be able to fulfil the current needs of both MNOs and towercos

The mobile industry landscape has radically changed in the last 5–10 years. Relevant industry changes that would impact the terms of the contracts between towercos and MNOs would include:

- new technologies/applications (e.g. multi-band antennas, mMIMO antennas, single-RAN, C-RAN, edge computing, IoT/LPWA networks)[1]
- increasing adoption of active RAN sharing
- evolved regulatory frameworks
- demand for non-traditional structures
- presence of new business models.

Region	Country(-ies)	Buyer	Seller	Year
Europe	Netherlands	Open Tower Company (OTC)	KPN	2008, 2010
	Spain	Cellnex	Telefónica	2012
	France	FPS Towers (now ATC Europe)	Bouygues	2012
Latin America	Brazil	ATC	GVT	2002
	Brazil	ATC	Nextel	2003–2008
	Mexico	ATC	Telefónica	2011
	Colombia	BR Towers (now ATC)	Millcom/Tigo	2011
Sub-Saharan Africa	Ghana	Helios Towers	Millicom/Tigo	2010
	Nigeria	IHS	Visafone	2010
	South Africa	ATC	Cell C	2010
Asia	Indonesia	Protelindo	Hutchinson	2008
	India	ATC	XCEL Telecom	2009
	India	QTIL (Viom Networks)	Tata Teleservices	2009

FIGURE 1: A NON-COMPREHENSIVE SELECTION OF THE INITIAL SLB DEALS OUTSIDE THE USA
[SOURCE: TOWERXCHANGE, 2019]

As a result of the above-mentioned industry changes, the original contracts between towercos and MNOs may no longer be best suited to future needs.

The contract renegotiation should focus on achieving a 'win-win' situation between the towerco and the MNO customer

The renegotiation between towercos and MNO customers does not have to be 'win-lose': a 'win-win' situation is possible. A contentious relationship is likely to result in a reduced volume of business for the towerco – either in terms of new sites, tenancies or amendments – and higher network capex for the MNO customer.

To achieve a win-win dynamic, it may be necessary for the towercos to take a more proactive role rather than waiting for MNOs to knock at their doors asking for changes. The negotiation strategy should not centre around defending the status quo but rather on maximising the value of the contract with the MNO. Towercos can take the opportunity to expand into new areas of business outside co-location and upgrade the traditional 'steel and grass' business model. This strategic shift is not risk-free and towercos may need to acquire new skills and adopt differentiated business models (including changed pricing and margins) that are more suited to these new areas. However, updating the positioning is likely to make the relationship between MNOs and towercos more future-proof and generate long-term benefits.

Towercos will need a clear negotiation strategy ...

The first step for the towerco is to understand its ambitions and the strategic priorities. These should be consistent with the resources that are available and the interest of the shareholders (especially where the towerco is not a public company). The towerco's strategy should then be developed in a long-term business plan.

The second step is to understand the MNOs' network strategy. Analysis of MNO strategy provides towercos with a view of MNO priorities and of the range of outcomes the counterparty may seek during the renegotiation (e.g. network expansion, indoor coverage/in-building solutions, additional capacity, antenna upgrades, and urban densification through macro or small cells). This will help the towerco to position itself as the strategic partner that MNOs are looking for to support their future network roll-out and upgrade.

The third step is to develop a list of commercial and technical scenarios and simulate the financial impact of these scenarios through the business plan. The latter must be deliberately designed to compare different outcomes. These scenarios will allow the business plan to be a decision-making tool, which becomes even more powerful when coupled with a tower model that is able to capture the impact of more technical aspects of the tower business (e.g. structural and wind-load constraints).

The fourth step is to design a negotiation strategy that aims to maximise the enterprise value leveraging on the findings of the scenarios analysis.

... and should be flexible in adjusting their positions while always trying to maximise the enterprise value of the company

The range of possible MNO technology and network roll-out strategies that will be adopted depends, to some extent, on what the towercos are able to offer. We expect that, in practice, the negotiation will be iterative, with both parties required to examine new options or propose new terms. The ability to evaluate the impact of the proposed terms on the towerco's valuation in an equally flexible manner will save time and give the towercos assistance during the negotiations, increasing the likelihood of an efficient process and a satisfactory outcome for both parties.

Analysys Mason has a strong track record of working for towercos and their shareholders, having completed ~100 tower-industry-related assignments in the last five years. This includes work across the five continents, in both developed and emerging markets. Analysys Mason has a 360-degree view of the towerco industry and in-depth knowledge of the commercial, technological, operational and regulatory aspects of the business. This unique positioning makes Analysys Mason the ideal partner for towercos.

[1] C-RAN = Cloud-RAN or centralised RAN; IoT = Internet of Things; LPWA = low-power wide area

Questions?
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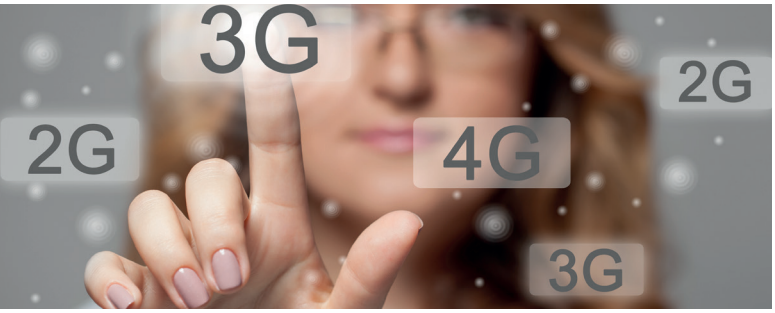
Operators' decisions to shut down legacy 2G/3G networks need to be commercially driven

Dion Teo, Principal, Consulting



Mobile network operators (MNOs) across the globe have already started to decommission legacy 2G/3G networks. Some of these network shutdowns have been initiated by regulators in consultation with the industry, but most have been operator-led, and have largely been due to the need to commit additional spectrum to 4G in order to cater to the strong 4G data traffic growth (although opex savings have also been a factor). Earlier network shutdowns were primarily 2G-focused, but 3G network shutdowns have been gaining traction in recent years (Figure 1).

Decisions on legacy network shutdowns need to be commercially driven and must balance the benefits and risks

There are trade-offs to be made when decommissioning legacy 2G/3G networks, and it is important for operators to quantify the benefits and the risks involved in order to make an informed decision. There are two key benefits resulting from the shutdown of legacy networks.

- **Increased spectrum available for 4G.** 4G network traffic worldwide has been growing at a very fast pace, and it is expected to continue growing at a CAGR of 42% over the next 5 years.[2] Congestion levels on 4G sites are increasing, and if additional spectrum is not made available by regulators, operators may need to re-farm 2G and 3G spectrum to help address the increased capacity requirements for 4G sites. Increased 4G capacity will result in an improvement in customer experience, which will aid both the acquisition and retention of subscribers. This may ultimately contribute to revenue and margin growth.
- **Network cost savings.** Operators stand to gain opex savings by decommissioning legacy networks. The magnitude of these opex savings varies by operator, and depends on factors including the extent of equipment modernisation and how contracts with vendors (such as network maintenance contracts and tower leases) are structured. Decommissioning 2G and 3G networks may also reduce future capital expenditure, particularly if the 2G and 3G networks are reaching the end of their lives and require a capex refresh. The incremental costs for deploying re-farmed spectrum for 4G will also need to be considered in order to derive a net benefit from the legacy network shutdown.

Country	Operator	Network	Shutdown date[1]
Australia	Telstra	2G	2016
USA	AT&T	2G	2017
Singapore	Government led	2G	2017
Taiwan	Government led	2G	2017
Norway	Telia/Telenor	3G	2018
India	Airtel	3G	2019
USA	AT&T	3G	2022
UK	Vodafone	3G	2022
Australia	Telstra	3G	2024

FIGURE 1: NETWORK SHUTDOWNS, BY COUNTRY
[SOURCE: NEWS ARTICLES AND OPERATOR PRESS ANNOUNCEMENTS]

The incremental benefits above will need to be balanced against the risks involved for operators. There are two key risks from shutting down legacy networks.

- **Losing subscribers that only use legacy 2G/3G networks.** Decommissioning 2G/3G networks may lead to a decrease in revenue and margin due to the loss of subscribers that are solely using legacy networks. In the case of a 2G network shutdown, subscribers using 2G-only devices will lose access to mobile services. Subscribers on 2G-capable 3G devices could still fall-back onto a 2G network for voice services in the event of a 3G network shutdown, but the data experience will be severely downgraded and thus these customers might churn to a competitor that still has a 3G network (unless they can be converted to 4G devices).
- **Losing subscribers that have a heavy reliance on 2G/3G networks.** Ideally, subscribers that own a 4G-capable device should spend most of their time on a 4G network. However, some subscribers may be heavily reliant on legacy networks (2G/3G), for either voice or data usage. Subscribers may be forced to rely on 2G or 3G networks where 4G coverage is limited or patchy. Operators need to identify and address the root cause for the reliance on these legacy networks. Decommissioning legacy networks and considering only the direct risk of losing subscribers on 2G/3G devices may materially underestimate the total risk involved in the shutdown.

Given the complexities and trade-offs that are required to reach a shutdown decision, we expect that the main decision taker will play a central role within the operator (such as being a member of the strategy or marketing team), and that the network team will provide the necessary advice and support. Both the marketing and network teams will need to develop mitigation strategies in order to address the risks from any network shutdown. These risks and mitigations may include those in Figure 2.

Analysys Mason advises mobile operators around the world on a range of commercial and technical issues, including 5G. We have experience in helping MNOs in both developing and developed markets to evaluate whether to shut down legacy networks. We can also help MNOs to design campaigns to migrate subscribers to new technologies.

[1] Note that planned shutdown dates are based on past announcements by operators and may change.

[2] For more information, see Analysys Mason's DataHub.

Department	Issue	Examples of mitigations
Marketing	Subscribers with 2G/3G-only devices	Design device swap/subsidy programmes for high value subscribers Design suitable tariff plans to assist low-end users to obtain access to 4G-capable devices
Marketing	Usage of legacy SIM card that does not support a connection to 4G	Launch campaigns to encourage subscribers to visit retail outlets to swap out SIM cards
Network	Coverage gap leading to a fall-back on the legacy network	Improve 4G network coverage and, in particular, the usage of low-frequency spectrum for in-building penetration
Network	Circuit-switched fall-back for voice leading to a loss of 4G connectivity	Tighten network parameters for faster reconnection to 4G; VoLTE expansion

FIGURE 2: EXAMPLES OF MITIGATIONS TO MANAGE RISKS FROM NETWORK SHUTDOWNS
[SOURCE: ANALYSYS MASON, 2019]

Questions?
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The digitalisation of the bioeconomy will provide opportunities for operators and ICT providers

Maria Tunberg, Principal, Consulting

The bioeconomy is one of the EU's largest and most important sectors; it has an annual turnover of EUR2 trillion and employs 18 million people.[1]

The bioeconomy encompasses areas such as agriculture, forestry and fishery (Figure 1), and provides essential products (such as food and energy) to an increasing population. In addition, the sector offers bioenergy and bio-based products that could be used as alternatives to fossil-based options. The bioeconomy is therefore vital for solving global challenges related to resource efficiency and sustainability. It is currently undergoing a rapid digital transformation, but it has only recently begun to catch the attention of operators and ICT providers.

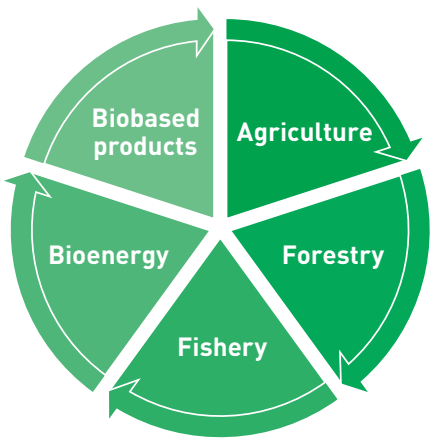

FIGURE 1: OVERVIEW OF THE AREAS THAT MAKE UP THE BIOECONOMY
[SOURCE: ANALYSYS MASON, 2019]

In order to unlock the full potential of the digital transformation of the bioeconomy, several aspects need to be considered, including connectivity development, data security, competence and acceptance among users. Analysys Mason is co-ordinating a project on behalf of the Nordic Council of Ministers with the aim of facilitating the digital transformation of the Nordic bioeconomy. The results from the first part of the project, including an analysis of the aspects of the digitalisation that have a strategic relevance for the competitive Nordic bioeconomy, were presented at the ministers' meeting in 2018. The second part of the project is focused on enhancing the digital transformation of the Nordic bioeconomy through knowledge exchange and collaboration between test and demonstration facilities (also known as 'testbeds'). These testbeds bring together stakeholders from the private and public sectors and provide opportunities to develop, test and commercialise new digital technologies and services for the agriculture and forestry sectors.

Narrowband IoT and autonomous vehicles will support data collection in the agricultural sector

Ericsson and Telia, together with players from various other disciplines, are supporting a testbed in Sweden with the aim of developing digital solutions for the agricultural sector. These solutions include decision support systems and new autonomous vehicles, and will contribute to enhanced profitability and sustainability in the sector.

Narrowband IoT (NB-IoT) will be used to collect quality-assured data from the fields that form the testbed. The data gathered will include the nutrition content of the soil, the level of moisture at various depths of the soil, the precipitation level over time and the temperature in the fields. In addition, connected working vehicles will supply information about aspects that are vital to farming, such as energy usage and the amount of nutrients and plant-protecting chemicals that are used on the fields.

The data that are gathered from the fields using the NB-IoT network will be managed by a cloud service that is linked to systems that provide open data, such as the Swedish Meteorological and Hydrological Institute and the Swedish Board of Agriculture. After collating and analysing the information, the results will be used to provide feedback and decision support for farmers, and to provide input data for the autonomous vehicles that are performing driverless operations in the fields (Figure 2).

Issues related to digital security, standardisation and connectivity coverage need to be addressed before deployments can be enabled at scale

The rapid digital development in the bioeconomy raises important questions related to digital security and the harmonisation of systems and standards, for example. Moreover, such developments place great demands on connectivity coverage and connectivity management. These are areas that need to be addressed in order to enable deployments at scale, and various players will need to be involved, including both public and private organisations.

The telecoms sector has an important role to play here; it can provide knowledge, technologies and the connectivity needed to realise the future use cases in the bioeconomy. This could include the customisation of cellular IoT and IoT platforms, as well as the roll-out of 5G. Agricultural and forestry businesses are often remotely located, so there will be a number of challenges related to coverage and connectivity management.

Analysys Mason has been involved in several projects related to the bioeconomy, including assignments for the Nordic Council of Ministers and associated organisations (such as Nordic Forest Research and Nordic Agri Research). Analysys Mason is ideally positioned to help operators and ICT providers to explore this untapped market, having developed an extensive network and in-depth knowledge of the challenges and opportunities linked to the bioeconomy.

[1] European Commission (2018), A new bioeconomy strategy for a sustainable Europe. Available at https://ec.europa.eu/research/bioeconomy/pdf/ec_bioeconomy_actions_2018.pdf#view=fit&pagemode=none.

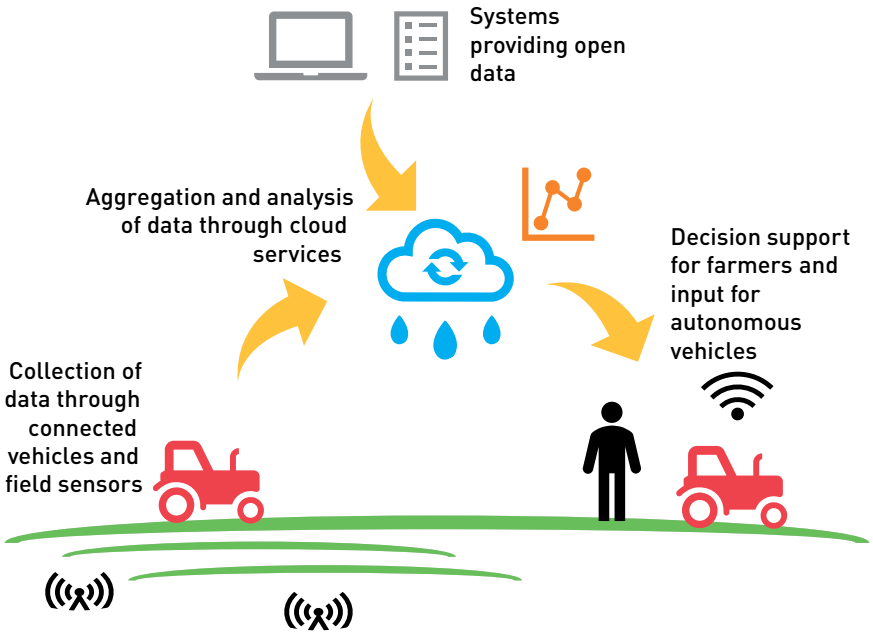

FIGURE 2: : ILLUSTRATION OF THE TECHNOLOGIES DEPLOYED IN THE TESTBED [SOURCE: ANALYSYS MASON, 2019]

Questions?

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Opinions differ on the need for a dedicated spectrum allocation for the utilities sector

Ian Adkins, Principal, Consulting

The utilities industry faces some significant challenges associated with the delivery of resilient and cost-effective utilities networks (for example, electricity distribution) and there is a shared view within the industry that access to dedicated radio spectrum will be needed to meet these challenges. However, not all stakeholders are aligned, and some neighbouring countries are adopting differing approaches to spectrum allocation. For example, while the telecoms regulator in Ireland, ComReg, is currently consulting on its proposals to allocate spectrum for dedicated use by the utilities sector, Ofcom in the UK has previously indicated that the case for a similar allocation of spectrum is not compelling.

Although a compelling case for dedicated spectrum for utilities may emerge in the UK, the current positions adopted by both telecoms regulators may simply reflect the differences between the telecoms markets in Ireland and the UK. This set of circumstances may merit the use of services provided by commercial mobile network operators (MNOs). For example, the government in the UK is implementing an emergency services network (ESN) with commercial MNO EE, which is intended to replace the current UK TETRA solution that is used by emergency services. In the UK, the government and the regulator may believe that the ESN, or a similar solution hosted by an MNO, is sufficient for the requirements of the utilities sector. However, energy companies in the UK unanimously maintain that commercial MNOs, including the enhanced ESN, do not offer adequate levels of coverage and resilience to support the need for a secure energy supply, which is one of the system failure risks highlighted in the UK's national risk register for civil emergencies.[1]

The electric power industry in the UK provides an example of the range of ongoing initiatives that aim to address concerns faced by stakeholders, including questions around catastrophic power failures (and the associated need for 'black start' capability), cybersecurity and smart grid requirements, and how telecoms solutions can be delivered to meet the requirements. Notably, however, many of these initiatives do not, in isolation, provide sufficient evidence to support an allocation of spectrum in the UK.

- **Distributed ReStart**[2] is a research project that is investigating how to restore power after a total or partial blackout, in which communications will be needed for hundreds of 'black start' generators in distributed and often remote locations. The project is ongoing and has already determined that existing telecommunications networks are unsuitable, and a need for new telecommunications and control systems has been identified. However, 'black start' requirements represent only a subset of the potential industry requirements for spectrum.
- **The Strategic Telecoms Group (STG),**[3] a sub-group of the Energy Networks Associations (ENA), has developed a position statement that advocates the allocation of radio spectrum for electricity network companies because it is "the most cost--efficient and technically appropriate option to facilitate dedicated and robust communications to support the volume of smart grid devices being deployed now and anticipated in the future"[4] However, Analysys Mason believes that additional evidence will be needed in order to persuade regulators to support this position when allocating spectrum.
- **The Joint Radio Council (JRC)** has undertaken a technical trial using licensed spectrum in the 450MHz band with a single base station. A project update was recently presented at a JRC seminar[5] explaining that the next stage will involve trialling more base stations. Analysys Mason understands that these trials will establish the technical suitability of spectrum allocation to meet coverage requirements, but the trials will not address the costs on a national scale, nor assess the alternative of deploying commercial solutions.
- **Ofcom** announced a project at the same JRC seminar to consider its spectrum strategy for utilities networks and explained that the first task will include exploring solution options. The findings from Ofcom's analysis will be an important influence on potential policy change towards allocation of spectrum for utilities in the UK.

Through Analysys Mason's involvement with the European Utilities Telecom Council (EUTC), we are aware that the issue of spectrum allocated for utilities is an international challenge and the opportunity to use 5G technology is viewed as a potential solution to this problem.[6]

However, Analysys Mason's research into opportunities for telecoms operators in the energy vertical (such as providing solutions for smart grids)[7] shows that telecoms operators often see the utilities sector as one among many of their end-user industry verticals, and one that sometimes has complex requirements to address, particularly because it presents only a small market opportunity. There is a risk, therefore, that telecoms operators will not meet the full requirements of the utilities sector, or that the costs of meeting these requirements could be exorbitant.

Although the utilities and telecoms sectors – and their respective regulators and government policymakers – have engaged in dialogue, their positions on the allocation of dedicated spectrum for utilities need to converge. This must happen in order to optimise the inherent trade-offs between utilities network cost, system performance and resilience in an efficient manner.

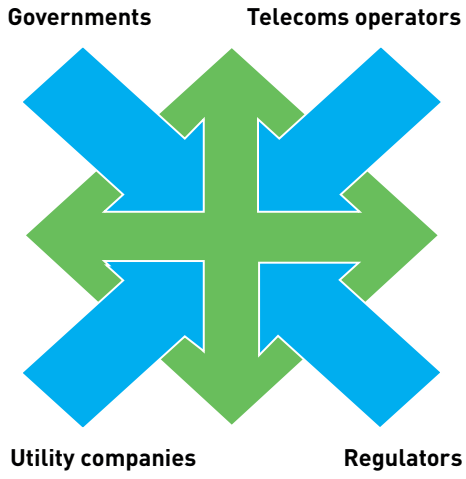


FIGURE 1: STAKEHOLDERS' VIEWS ON ALLOCATING DEDICATED SPECTRUM TO UTILITIES COMPANIES MUST CONVERGE
[SOURCE: ANALYSYS MASON, 2019]

Analysys Mason believes that achieving a national allocation of dedicated spectrum for utilities in any country will need compelling technical and commercial justification. The business case needs to be proven by comparing the feasibility, costs and risks associated with other utilities network system delivery options, such as building private networks using shared spectrum and using MNO commercial networks with enhanced capabilities.

The issues outlined in this article are important for utilities companies, national and regional governments, telecoms regulators and utilities regulators, fixed and mobile telecoms operators, and investors. Analysys Mason has undertaken numerous telecoms options appraisals that utilise our deep market insights and modelling experience to offer independent and pragmatic recommendations to resolve complex issues such as these.

[1] Gov.UK (14 September 2017). National Risk Register of Civil Emergencies – 2017 Edition. Available at: https://www.gov.uk/government/publications/national-risk-register-of-civil-emergencies-2017-edition.

[2] National Grid, Distributed ReStart. Available at: https://www.nationalgrideso.com/innovation/projects/distributed-restart.

[3] The STG is responsible for helping the industry to decide its position on issues such as spectrum, and it is also responsible for providing input to the Energy Emergency Executive Committee (known as E3C), the government agency responsible for ensuring the country can handle energy emergencies.

[4] Energy Networks Association. Energy Telecommunications. Available at: http://www.energynetworks.org/electricity/engineering/energy-telecommunications.html.

[5] Joint Radio Company (September 2019). 2019 Conference: The UK Smart Grid Vision. Available at: https://www.jrc.co.uk/conferences/2019.

[6] EUTC (June 2019). Workshop on 5G. Available at: https://eutc.org/event/workshop-on-5g/

[7] See Analysys Mason's Smart-grid opportunities for operators are emerging, but challenges remain. Available at: www.analysysmason.com/Research/Content/Comments/smart-grid-opportunities-rdme0.

Questions?
Please feel free to contact Ian Adkins, Principal, Consulting at ian.adkins@analysysmason.com

E-pharmacies in India: global and local trends point to a positive future

Rohan Dhamija, Partner, Head of India and the Middle East, Consulting

Amazon acquired US-based e-pharmacy company PillPack for USD753 million in 2018, in a move that sent shockwaves through the pharmaceutical industry around the world. The ripples were felt in India as well, resulting in a series of big-ticket investments in the year following the acquisition. The Government of India is due to implement a new regulatory framework and guidelines relating to online pharmacies that should help to further stimulate this sector. This article assesses the state of the e-pharmacy industry in India, the drivers of its growth and its future prospects.

Online pharmacies can address the gaps left by the traditional pharmacies in India

India's pharmaceutical sector is the third-largest in terms of volume in the world and the thirteenth-largest in terms of value. The retail pharmaceutical market in India was worth around USD24 billion in 2018 and is growing rapidly. However, the sector is facing several challenges due to low industry margins, rising price pressure, poor documentation and tracking, non-compliance with laws (selling medicine without prescriptions), poor inventory management and a limited ability to stock all available stock-keeping units (SKUs). The retail pharmacy sector needs technical solutions to overcome these challenges and increase efficiency.

This need gap provides a perfect opportunity for e-pharmacy players to add value. E-pharmacies offer a way for customers to order medicines from the comfort of their homes, at discounted prices with just a few clicks. The sector has tremendous potential for growth fuelled by an increasing number of patients with chronic diseases, such as diabetes, hypertension etc., which require regular medication. In addition, the e-pharmacy market will be boosted by the increasing availability of smartphones, digital payments and health insurance, and the rising levels of disposable income.

We expect the e-pharmacy sector to flourish in India for three main reasons.

Online pharmacies add value for consumers

Five factors are attracting consumers to e-pharmacy solutions (see Figure 1).

Convenience. Customers who require regular medication value the ability to have medicines delivered to their doors.

Accessibility/availability. E-pharmacies can offer a wide range of SKUs to their customers by aggregating supply – such scale is difficult to achieve for local pharmacies.

Affordability. E-pharmacies can source products directly from manufacturers and can, therefore, offer more-significant discounts than local pharmacies.

Information and education. E-pharmacies can provide knowledge to customers to help them to make informed decisions.

Compliance and authenticity. The authenticity of drugs can be assured because e-pharmacies store all records digitally, which effectively reduces the risk of counterfeit medicine.

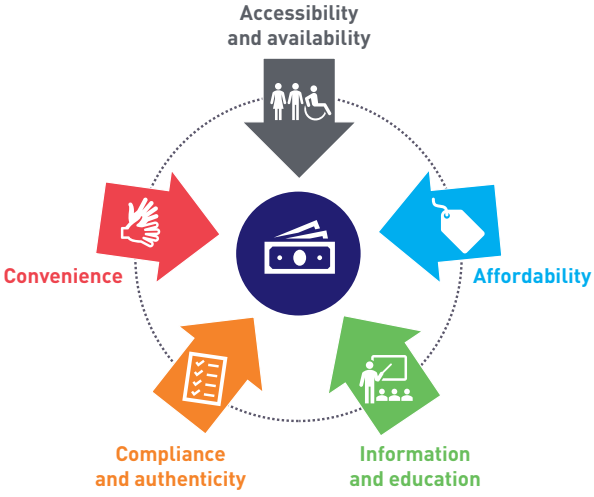


FIGURE 1: FACTORS OFFERED BY E-PHARMACY COMPANIES THAT ADD VALUE TO CONSUMERS [SOURCE: ANALYSYS MASON, 2019]

The e-pharmacy sector in India has caught the attention of investors

The growth potential and opportunity in the e-pharmacy sector has generated a lot of interest from investors. The key players in the sector such as PharmEasy, 1mg, NetMeds and Lifcare have recently raised significant capital. For instance, PharmEasy has secured funding of USD100 million while 1mg has secured USD80 million. With increasing interest from big investors such as Softbank (according to public sources), the sector can expect an upward trend in investment.

Government policies and regulation look favourable

The e-pharmacy sector in India is positive about new regulations that are likely to come into effect by the end of 2019. The government released draft regulations in 2018, which were well received by the sector. The draft guidelines allow for the Drug Controller General of India (DCGI) to regulate the e-pharmacies and for online retailers to sell drugs all over the country with a single licence (as opposed to having separate licences, and retail presences in every state). This will make it easier to do business, relieve cost burdens and help the players to expand into more regions.

Given that the e-pharmaceutical sector will make it easy for people to access affordable medicines, and that it has government and investor support, revenue is expected to grow strongly at about 54% CAGR in the next 4 years to reach about USD2.1 billion in 2023, when the sector will account for around 5% of revenue in the overall pharmaceutical sector (see Figure 2).

Competitive landscape

Around 85% of the e-pharmacy market in India is dominated by four major players. Medlife accounts for around 30% of revenue in the market followed by PharmEasy, 1mg and NetMeds. Other players include CareOnGo, Lifcare, mChemist, MedsOnWay and Myra. E-pharmacy players have a major presence in metros, but they plan to expand their reach in Tier 2 and Tier 3 cities as well. Customer acquisition is mainly driven by a high level of discounts and promotions.

E-pharmacy players are also looking forward to offering a wide range of complimentary services. The aim is to become a one-stop solution for all healthcare needs. Such services include online consultations, doctor appointments, partnerships with diagnostics centres, sample collection, online health blogs, medicine refills and subscriptions. These services aim to attract and retain customers, and increase

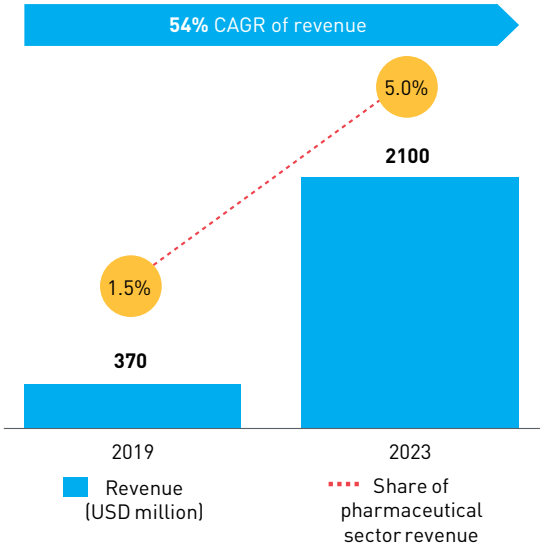


FIGURE 2: REVENUE OF THE E-PHARMACY SECTOR AND SHARE OF PHARMACEUTICAL MARKET REVENUE, INDIA, 2019 AND 2023 [SOURCE: ANALYSYS MASON, 2019]

options for revenue generation. Medlife, PharmEasy and 1mg offer diagnostic laboratory tests and sample collection. Medlife and 1mg offer online doctor consultations through their websites and apps, and Medlife offers offline doctor appointments.

The unit economics for online pharmacies are expected to improve

The e-pharmacy sector in India is in a nascent stage and all the players are burning huge amounts of cash in discounts and promotions. The aim is to gain a customer base and drive change in customer behaviour towards the online purchase of medicines, a model tried and tested by players in the e-commerce and food delivery sectors. The unit economics are expected to improve in future because discounting will reduce and scale efficiency will kick in for supply chain and warehousing.

The e-pharmacy sector is at the stage that the e-commerce and online food delivery sectors were at 5 and 2 years ago respectively. The lessons from these sectors will be invaluable as the e-pharmacy market in India seeks to build on the increasing number of investments and the favourable regulatory changes.

Questions?
Please feel free to contact Rohan Dhamija, Partner, Consulting at rohan.dhamija@analysysmason.com

Spectrum auction tracker

Analysys Mason's *Spectrum auction tracker* provides granular, accurate details and analysis of concluded auctions and planned auctions of mobile and fixed wireless spectrum, reaching back to 2005.

Data is provided in a fully searchable spreadsheet format, for use as a benchmarking and planning tool, and is updated quarterly.

The information for each concluded auction includes:

- geographical region, country and date of the auction
- frequency and bandwidth
- average duration of licence
- price per MHz per population (in EUR)
- mobile penetration rate (at country level)
- broadband penetration rate (at country level)
- name of controlling regulatory agency.

The tracker also provides details of forthcoming and planned spectrum auctions, including:

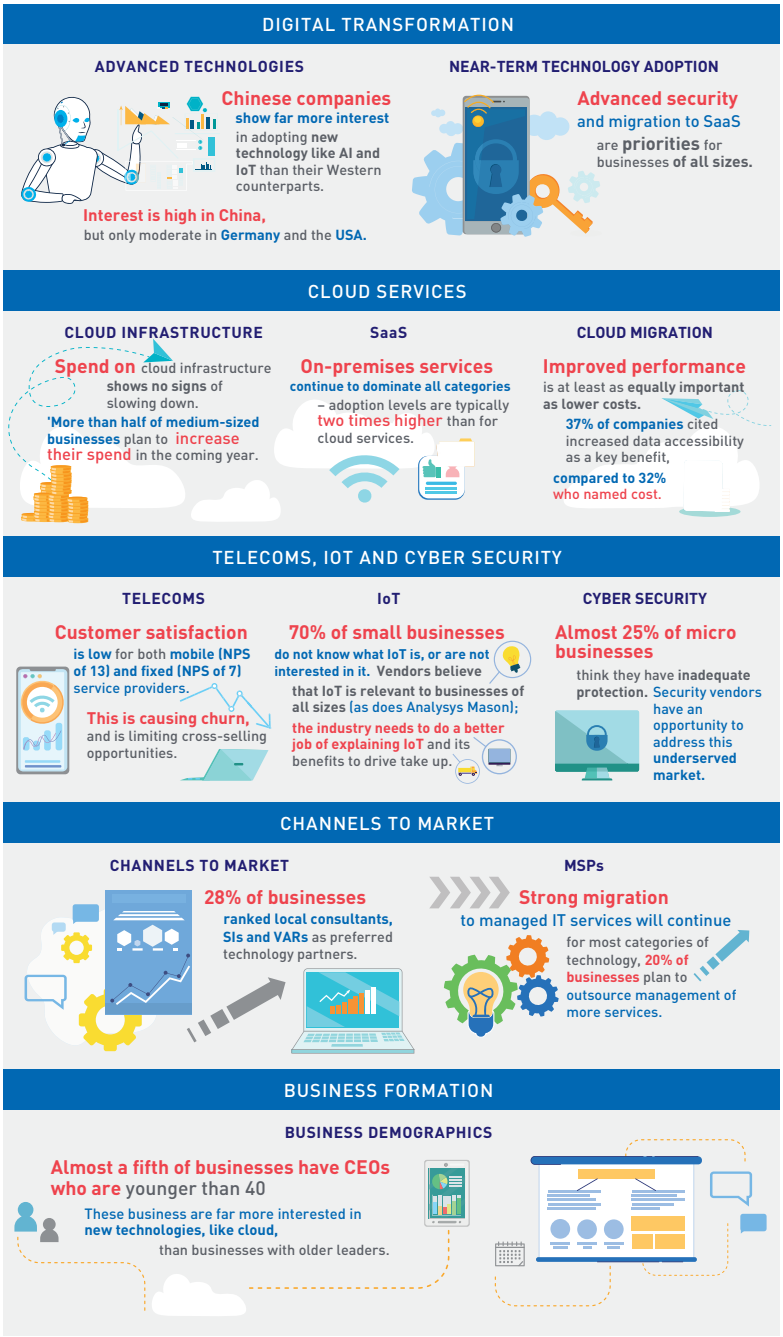
- geographical region and country in which the auction is to take place
- frequency and bandwidth to be made available
- status (for example, planned or publicly announced)
- planned auction date and methodology (where known)
- name of controlling regulatory agency.

For more information on our spectrum Research and Consulting expertise, please contact Rupert Wood, Research Director, Research at rupert.wood@analysysmason.com or Janette Stewart, Principal, Consulting at janette.stewart@analysysmason.com

New report: Small and medium-sized businesses: technology buying behaviour and channel preferences

Analysys Mason interviewed 3000 global SMBs asking questions on topics relating to all aspects of businesses' telecoms and technology usage and future plans including: digital transformation; cloud services; telecoms, IoT and cyber security; channels to market and business formation.

Top level findings are highlighted in the infographic below. For more information on each of the key findings download our survey results report summary at www.analysysmason.com/smb-technology-survey

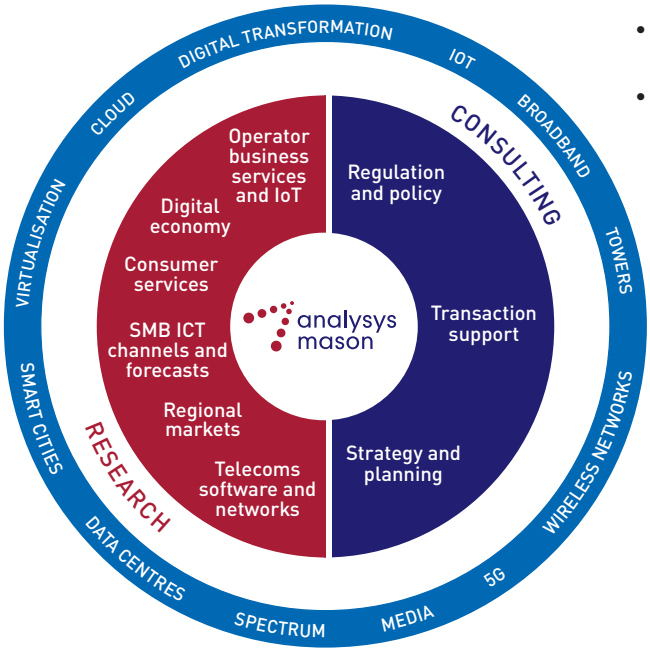


For more information on our SMB Research and Consulting expertise please contact Tom Rebbeck, Research Director, at tom.rebbeck@analysysmason.com or Deepinder Sahni, Principal, at deepinder.sahni@analysysmason.com

Analysys Mason's consulting and research are uniquely positioned

Analysys Mason is the global specialist adviser on telecoms, media and technology (TMT). Since 1985, Analysys Mason has played an influential role in key industry milestones and helping clients through major shifts in the market. We continue to be at the forefront of developments in the digital economy and are advising clients on new business strategies to address disruptive technologies.

See what clients have to say about working with us: www.analysysmason.com/client-testimonials



About our services

At Analysys Mason, we understand that clients in the TMT industry operate in dynamic markets where change is constant. Our consulting and research has helped shape clients' understanding of the future so they can thrive in these demanding conditions.

Consulting

- We deliver tangible benefits to clients across the telecoms industry
- Communications and digital service providers, vendors, financial and strategic investors, private equity and infrastructure funds, governments, regulators, broadcasters and service and content providers
- Our sector specialists understand the distinct local challenges facing clients, in addition to the wider effects of global forces
- We are future-focused and help clients understand the challenges and opportunities new technology brings.

Research

- Our dedicated analyst team tracks and forecasts the services accessed by consumers and enterprises
- We offer detailed insight into the software, infrastructure and technology delivering those services
- Clients benefit from regular and timely intelligence, and direct access to analysts.

"Analysys Mason is the global specialist adviser on telecoms, media and technology (TMT). Since 1985, Analysys Mason has played an influential role in key industry milestones and helping clients through major shifts in the market. We continue to be at the forefront of developments in the digital economy and are advising clients on new business strategies to address disruptive technologies."

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