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Consulting and research specialists in telecoms, media and technology

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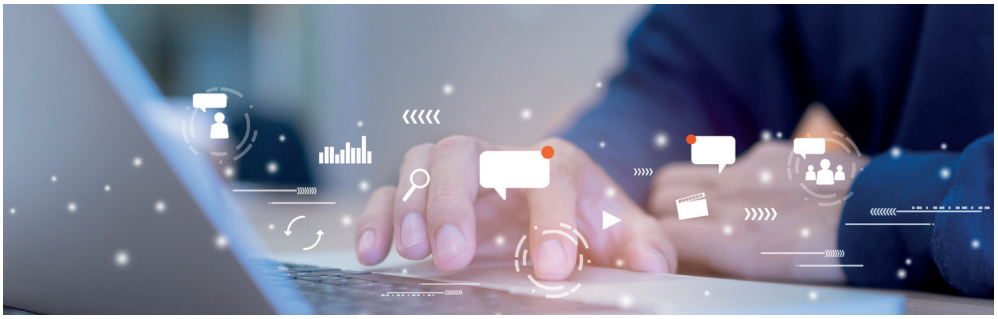
Contents



Analysys Mason's predictions for M&A activity in the telecoms market in 2021

Alessandro Ravagnolo, Principal, Consulting

2020 was the year when Covid-19 disrupted our lives, but it is also the year that demonstrated how important the telecoms, media and technology (TMT) sector is in the modern world. The mergers and acquisitions (M&A) deal flow continued throughout the year, largely unaffected by the pandemic. Investors showed strong appetite for digital infrastructure (in particular) and all stakeholders involved in transactions – from investors to advisers – demonstrated resilience by quickly adapting to a new modus operandi.

2021 is expected to be a year of great dynamism with opportunities across the TMT value chain for an even wider audience of investors than seen before. Analysys Mason is pleased to present its top 10 M&A predictions.

Prediction 1: Investors will re-balance their portfolios towards digital infrastructure

Covid-19 had different impacts across the infrastructure verticals. Some verticals proved to be more exposed than others to the downturn created by the Covid-19 outbreak, whilst digital infrastructure, along with renewable energy, was one of the most resilient. The pandemic accelerated some positive dynamics, especially the digitalisation of many sectors and the demand for high-speed and reliable connectivity. This acts as a stimulus to the demand for new-generation networks and improves their economics (e.g. more certainty around the demand). As a result, digital infrastructure is more than ever a sought-after – yet scarce – commodity that every long-term investors want in their asset portfolios. Sponsors that have not historically considered digital infrastructure as part of their remit are now expected to re-evaluate their position, while many generalist investors already active in the space will likely look to invest a higher share of their capital in telecoms infrastructure.

Prediction 2: Operators' lower valuations will trigger 'take-private' deals

Another side effect of the pandemic is that the trading value of public (non-infrastructure) operators has taken a hit. Many operators are in fact trading at lower values than they used to pre-Covid-19. Bold investors are expected to consider the buy-out of public companies with unexploited growth potential. This is especially true for those companies that have been capex constrained in the past. Private ownership could offer them the opportunity to plan more aggressive investment strategies than when they were public and accelerate network deployments and upgrades (especially on 5G and fibre) to exploit the positive dynamics discussed in the previous prediction. There have already been a few examples of this happening: the acquisition of MásMóvil in Spain by a consortium including KKR, Cinven and Providence, Patrick Drahi de-listing Altice Europe NV, and hedge fund Toscafund Asset Management making an offer to take TalkTalk in the UK into private ownership.

This expected wave of acquisitions has so far spared the largest operators despite many incumbents' share prices having decreased significantly at the beginning of 2020. However, this might not last if share value remains low in 2021. Some management teams are expected to defend the public positioning of their companies with bolder strategies. These are likely to include the usual efficiency measures (also through digitalisation of processes), but also further investments in new-generation networks that will further boost deployment and increase competition.

Prediction 3: European mobile consolidation will resume

European mobile operators are facing the perfect storm: rising capital requirements for spectrum, 5G deployment (and fibre deployment for converged players), saturated and highly competitive retail markets and additional pressure on financials driven by the Covid-19 outbreak. In this context, in-market consolidation is increasingly attractive to operators and their shareholders.

To overcome the hurdles imposed by competition authorities that opposed many consolidation deals, operators have signed an increasing amount of RAN (radio access network)-share deals as an alternative approach to reduce cost and increase efficiency. However, the 28 May 2020 General Court ruling that overturned the previous European Commission decision to prohibit the merger between Three and O2 in the UK is likely to radically affect the way future proposed mergers will be evaluated by the relevant European authorities. Once the dust has finished settling, we predict that there will be one or more consolidation attempts in the larger European markets to reduce the number of mobile network operators (MNOs) from four to three.

Prediction 4: Focus on mobile and fixed connectivity in rural and remote areas

Bridging the digital gap will play an increasingly central role in the agenda of policy makers and, subsequently, regulators in a post-pandemic environment. The roll-out of new-generation mobile and fixed networks in rural areas and the associated opportunities for investors in the fibre and tower spaces are common knowledge and have already been extensively discussed. The difference is that there used to be a rural threshold beyond which these traditional models were ineffective to produce the required returns on capital invested. This threshold is now being challenged and pushed back by the increased visibility/predictability of future cashflow due to the positive long-term dynamics created by the pandemic. As a result, rural connectivity is attracting more funding and well-designed subsidy/voucher policies could further boost the operators' appetite for deployment in rural areas. However, traditional infrastructure approaches are unlikely to be sufficient to tap into the opportunity offered by connecting most remote areas (beyond the aforementioned threshold).

On fixed broadband connectivity, we see fixed-wireless access (FWA) and satellite providers to benefit from increased demand and, therefore, take-up. In particular, we see an increasing interest in investment models where, through FWA, operators gain control of the subscriber base to then migrate customers to more scalable full-fibre platforms where the success rate or competitive threat demand it. This approach can be successful in de-risking deployment in rural areas where high up-front capex is required.

Mobile connectivity requires new business models to deal with the different economics of deploying networks in more challenging and less dense environments. Government subsidies are also less common in the mobile space than in the fixed space, thus further putting into focus the need to reduce the total cost of ownership of the infrastructure (taking into account both deployment and running costs). Existing players (e.g. towercos) can exploit this opportunity by changing their relationship with their MNO customers in remote areas. This could involve adopting a wider perimeter of operations. One example could come from taking advantage of the future virtualisation of radio access networks that will make the ownership of the hardware at the sites less relevant since hardware is more likely to be shared between MNOs. Opportunities could also be created by financial investors interested in supporting rural-focused, mobile neutral-host business models. Most success stories involve emerging markets, but at Analysys Mason we see advantages in replicating these models in developed economies as well.

Prediction 5: Larger tower carve-outs and innovative tower perimeters

We are going to see new large towercos in Europe in 2021. Vodafone's creation of Vantage Towers and the sale of CK Infrastructure tower assets to Cellnex are expected to pave the way for other large carve-outs and potential divestments in Europe and in other regions. Of interest is the fact that the wave of tower deals is predicted to expand to regions that have not been as active before. The two aforementioned deals showed increasing interest in Central and Eastern Europe (even beyond Poland) and the Nordics, but there are indications that Australia will become of interest and that Africa will see a higher number of deals than it has seen on average in the last few years.

Finally, we predict that we will see more sale-and leaseback deals with an innovative perimeter of operations.

Prediction 6: MNOs looking for wholesale revenue will increasingly target MVNOs

MNOs have been spending a lot of money on 5G between spectrum auctions and network deployment. The monetisation of 5G within the consumer segment remains unclear and subscriber take-up takes time to build up, thus resulting in low utilisation rates of mobile networks. In this context, MNOs are seeking ways to monetise this spare capacity by filling the pipe with more traffic.

One approach could be to offer FWA services in certain areas. Especially for MNOs without a fixed network, this is an attractive proposition because it does not cannibalise existing revenue streams and could reduce wholesale cost from avoiding to buy access from a wholesaler. However, the traffic generated by fixed broadband subscribers is much higher than that of mobile customers, and MNOs can only push this service to the extent that they do not jeopardise the quality of experience offered to mobile users.

A second option available to MNOs is to attract mobile virtual network operators (MVNOs) on their network. MNOs have fiercely fought for MVNO wholesale contracts in the recent past with notable MVNOs switching host networks. Alternatively, MNOs can buy the MVNO, which could allow them to maintain more steering on the positioning of the operator to reduce the revenue cannibalisation risk. This strategy has been followed by several operators that needed to build a subscriber base from scratch such as MásMóvil in Spain and DISH in the USA (each operator buying several MVNOs as a result). However, this strategy was also adopted by more established MNOs simply interested in the wholesale revenue stream, such as Verizon with the acquisition of Tracfone in the USA, Bouygues with the acquisition of Euro-Information Telecom in France, and Plus with the acquisition of Virgin Mobile in Poland.

MVNOs are primarily attractive to MNOs on the surface; however, they present interesting opportunities to private equity firms looking for assets with a robust market positioning but with room to improve the financial performance through improved wholesale terms with the host MNOs, which could also provide an interesting exit strategy.

Prediction 7: A major mobile operator will buy one of the IoT market disruptors

More than 30 innovative providers have shown that there is a market for Internet-of-Things (IoT) connectivity that is cost effective and simple to acquire. 1NCE, for example, sold over five million SIMs in less than two years thanks to its simple pricing plan and sales model, including online sales. Operators have so far failed to provide an answer to such offers, but at least one major operator will respond to this threat in 2021 by buying one of these players.

Prediction 8: Bright outlook for Latin America

We expect to see a solid pipeline of deals in the fibre space in the region. Fixed-line infrastructure in Latin America has been lagging behind North America and Europe, but this was partially compensated by dynamic mobile markets. This is no longer sustainable in such competitive markets and operators are expected to increasingly seek financial or strategic partners to fund their fibre expansion ambitions. This will pave the way for pure wholesale fibre infrastructure players that will certainly be interesting to investors used to the crowded American and European markets.

The tower landscape in Latin America has always been very lively with a long list of tower developers that have expanded their portfolios over time. The high fragmentation of most tower markets offers consolidation opportunities to aggregators such as ATC, SBA, IHS, Phoenix Tower International and Digital Colony, while the high demand for new sites also creates a favourable environment for the rise of new towercos which financial investors will use as growth platforms.

Prediction 9: Private networks will become a hot topic for financial sponsors

The deployment of private networks has quickly become a hot topic in the industry given the interest displayed by several industry verticals. To date, most of the deployments have been bespoke and led by vendors and, to a lesser extent, mobile operators, as shown by our private network tracker. However, specialist players have been emerging to fulfil the different technical requirements that the various industry parties are likely to have. These specialist players might partner with other companies across the value chain, including MNOs, to deliver end-to-end solutions customised to different service needs (e.g. healthcare, energy, etc.). By providing edge compute capabilities to support network cloud, players can also provide a cloud platform for an emerging set of secure, scalable enterprise applications, further monetising this investment. We expect the emergence of private-network specialists able to provide network platforms that can be leveraged to avoid duplications and make the roll-out of private networks cost effective and, in turn, more widely adopted.

These players will offer investment opportunities to venture capital or private equity firms interested in a space with significant growth potential. The sector could offer interesting exit strategies to vendors, operators and also infrastructure companies (e.g. Cellnex acquired Edzcom).

Prediction 10: RAN vendors will become targets of private equity firms

The future virtualisation of the radio access network (RAN) creates opportunities for smaller vendors to challenge the dominant position of the incumbents: Ericsson, Huawei, Nokia and ZTE. Mobile operators have made clear that the diversification of vendors is a strategic priority and that they are happy to make selective deployments to support emerging solutions that could gain a larger role in the future. Vodafone, Telefónica and MTN, among others, are showing their support to smaller vendors by deploying virtualised solutions in rural areas. These could also be ideal testbeds for Open RAN solutions too given (1) the potential cost savings that could be realised fit with the need to reduce costs to make rural investments economically sustainable and (2) the lower amount of traffic and revenue in these areas is compatible with taking risks associated with the deployment of a technology that still lags behind the one deployed by more traditional vendors according to many analysts.

R&D to support the evolution of the technology roadmap towards virtualisation can be expensive. We predict opportunities for investors to provide financial aid to new smaller vendors and, potentially, to invest in those vendors that have struggled to defend their market shares with the arrival of 5G and offer them a new opportunity to re-position their business towards virtual RAN solutions.

Narrowing down our predictions to just ten from an initial, comprehensive list of interesting trends and forecasts was a challenge, which reflects both the dynamic nature of the industry and the continuously expanding breadth of Analysys Mason's transaction support services. We would be pleased to further discuss our top predictions and those, no less important, that did not make the shortlist this year.

Analysys Mason is the commercial and technical adviser of choice of several major financial investors and industry players thanks to our exclusive focus on telecoms, media and technology (TMT) and the experience that we have gained in over 450 transaction support assignments worldwide during the last five years.

Do you have any comments on our M&A predictions for 2021? Please get in touch with the author, Alessandro Ravagnolo.

Questions?

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Further investment in 5G infrastructure could lead to over EUR160 billion of benefits in Europe

Janette Stewart, Principal, Consulting

Consumers are already using 5G mobile broadband (MBB) services in some countries, and these initial 5G services will be expanded as mobile network operators (MNOs) continue to invest in 5G coverage. Further evolution to standalone, virtualised architecture will enable additional 5G use cases to be delivered, including multiple low-latency, ultra-reliable applications.

Analysys Mason set out a 5G 'open innovation platform' in a recent study in conjunction with Ericsson and Qualcomm (Figure 1). This platform is formed of a wide range of innovative use cases that full 5G networks may be able to support. Our study focused on modelling the costs and benefits of deploying 5G technologies to deliver these use cases.

The use cases (bottom row in Figure 1) were grouped into clusters (middle row). This grouping helped to align our conclusions with different 5G policy themes and also aids interpretation.

Our aim was to develop new analysis of potential net benefits

When developing our analysis, we considered that many of the benefits of new 5G use cases are yet to be realised on a large scale. Hence, where possible, we referred to existing studies discussing said benefits in order to align our modelling with the published literature as much as possible. We also developed input assumptions for 5G deployment and benefits based on published industry experience from 5G trials that have already taken place in Europe[1]. We developed a detailed and robust analysis of the costs of rolling out additional infrastructure to deliver the 5G capabilities needed for the selected clusters/use cases in order to provide quantitative estimates of the net benefits (that is, the benefits delivered by the use cases, relative to additional deployment costs).

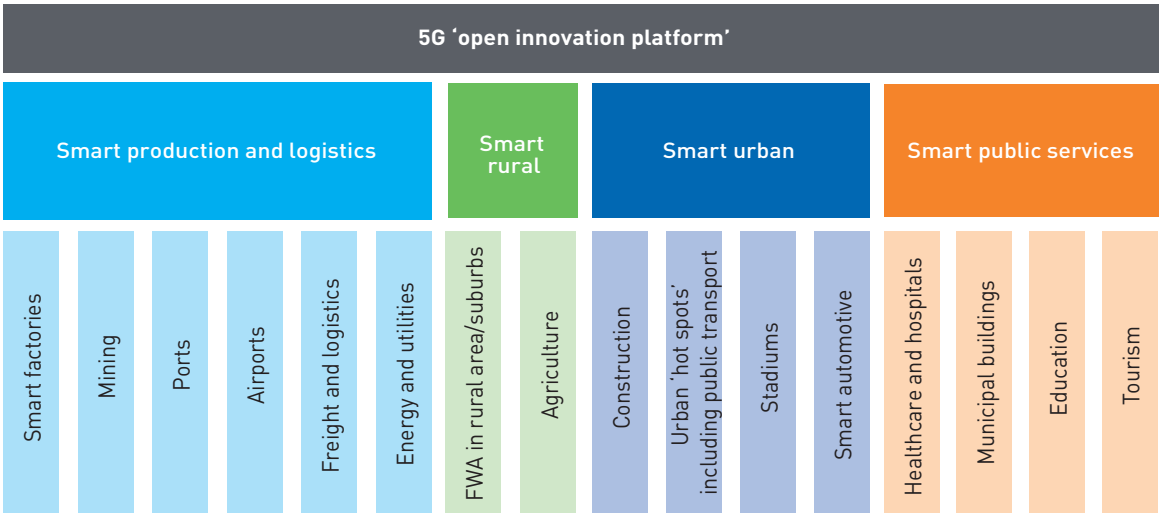
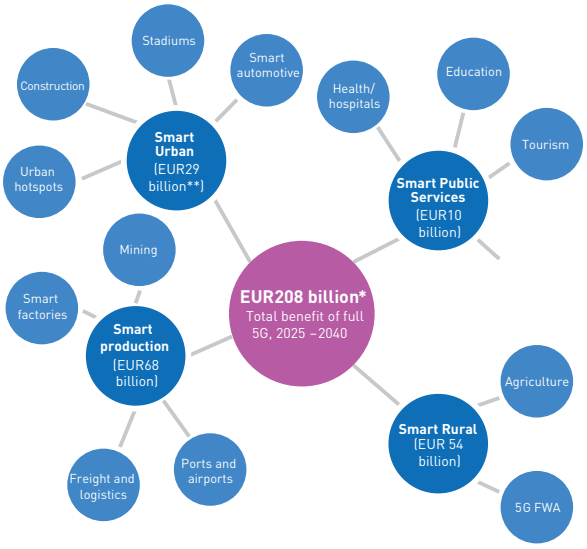


FIGURE 1: 5G OPEN INNOVATION PLATFORM [SOURCE: ANALYSYS MASON, 2021]

The economic benefits and additional infrastructure deployment costs of full 5G are calculated with reference to the 5G coverage that is expected in various European countries in 2025. Costs and benefits are incremental to those of current deployments (that is, the costs and benefits generated from the initial 5G deployment for consumer use are not included in our estimates). We assume that 5G will be deployed on 100% of existing mobile sites by 2025; 5G mid-band spectrum will be used on some sites, while others will use existing low and lower mid-band spectrum (for example, 700MHz–2.6GHz). We add further capacity and coverage to the base case using mid-band and/or high-band (26GHz) spectrum, which is use-case dependent.

Our analysis suggests that the benefit/cost ratio from investing in full 5G in Europe is over four

We estimate that the open innovation platform of full 5G networks in Europe will be able to deliver EUR208 billion of benefits at a cost of approximately EUR36 billion between 2025 and 2040 (representing a benefit/cost ratio of around four). The split of these benefits by cluster is shown in Figure 2. This suggests that European industrial policy should focus on accelerating the use of 5G infrastructure in the smart production and logistics cluster as a priority.



*Achieved from a EUR47 billion in investment into full 5G infrastructure (EUR161 billion) net benefit

**Net benefit (that is, benefit minus cost)

FIGURE 2: FULL 5G BENEFITS IN EUROPE [SOURCE: ANALYSYS MASON, 2021]

It also suggests that it would be beneficial for European regulators to enable rural 5G coverage, and to support further innovation in 5G deployment in cities.

We also identify that there will be a range of benefits from using 5G infrastructure in factories, agriculture, construction and other sectors. Potential environmental benefits from these deployments include the better use of time and materials (potentially leading to lower energy consumption), improved equipment lifetimes through real-time monitoring, increased efficiency and a reduced need for journeys (and lower journey times). Social benefits include improved sustainability for local and rural industries through better connectivity, better security and digitally skilled workforces.

It is essential that the accelerated roll-out of 5G continues in the coming years (up to 2025) in order to achieve these benefits. Operators should work towards 5G roll-out targets that are consistent with Europe's 5G Action Plan (5GAP). There should also be a focus on reducing any barriers to deployment. For example, the recent European Commission recommendation to use a common toolbox to reduce the cost of high-capacity network deployments should be followed[2]. Our study identifies the targeted action by policy makers and operators to expand the geographic coverage of mobile networks as a priority so as to deliver 5G services in rural areas. Allocating the remaining spectrum in all of the identified 5G pioneer bands (700MHz, 3.6–3.8GHz and 26GHz) will be important to accelerate 5G deployments.

Analysys Mason Consulting can help to develop deployment strategies for 5G and 5G spectrum roadmaps. We can also carry out cost/benefit/revenue analysis.

[1] For example, Qualcomm (2019), Qualcomm Technologies and Siemens set up the first 5G private standalone network in an industrial environment using the 3.7-3.8GHz band. Available at: https://www.qualcomm.com/news/releases/2019/11/26/qualcomm-technologies-and-siemens-set-first-5g-private-standalone-network; Qualcomm (2019), Qualcomm Technologies & Bosch Rexroth Showcase Time-Synchronized Industrial Devices Over Live 5G Network. Available at: https://www.qualcomm.com/news/releases/2019/11/25/qualcomm-technologies-bosch-rexroth-showcase-time-synchronized-industrial and Ericsson (2020), The 5G Port of the Future. Available at: https://www.ericsson.com/en/blog/2020/7/the-5g-port-of-the-future.

[2] European Commission (2020), Commission Recommendation on a common Union toolbox for reducing the cost of deploying very high capacity networks and ensuring timely and investment-friendly access to 5G radio spectrum. Available at: https://ec.europa.eu/digital-single-market/en/news/commission-recommendation-common-union-toolbox-reducing-cost-deploying-very-high-capacity.

Questions?

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Analysys Mason Research's telecoms, media and technology predictions for 2021l

Analysys Mason Research

The coronavirus pandemic has dominated 2020 and its effects will be with us for some time yet. Our annual telecoms, media and technology (TMT) predictions highlight the major trends that we expect to make an impact in the next 12 months.

Headline predictions

The telecoms sector will return to revenue growth in 2021. Our latest forecasts predict that telecoms service revenue worldwide in 2020 will be USD43 billion less than it was in 2019 (a year-on-year decline of 2.7%). We expect that a third of this loss will be recouped in 2021 with growth of USD13 billion (up 1% on 2020), but global telecoms revenue will not exceed 2019 levels again until 2023. Revenue from roaming, prepaid mobile and traditional business services was most severely hit during 2020, but will begin to recover in 2021 as economic activity, household income levels and travel patterns pick up again.

Operators will pursue new opportunities in 2021 and beyond. Businesses and individuals have been forced to reassess their priorities during 2020, which has brought some market opportunities into clear view, notably those at the intersection of cloud and connectivity. Operators will increase efforts to enable a new generation of networked entertainment services, with several operators providing edge cloud capabilities for cloud gaming services. In the business market, at least one operator will launch a cloud-based solution combining unified communications, security and remote access for home workers. Operators will try to push into important sectors that are undergoing transformation, for example by supporting remote healthcare and education projects. Telstra and Telefónica started doing this in 2020. Other incumbents will follow in 2021.

5G network disaggregation will disrupt the vendor landscape. Many operators will deploy 5G core networks independently of their relationships with RAN suppliers. This represents the first step in opening up the mobile network to more vendors. Virtual RAN deployments will largely be deferred beyond 2021 but will represent a USD22 billion market by 2025. Traditional suppliers will come under pressure and may need to restructure. Cloud vendors will acquire more telecoms-specific capabilities along the lines of Microsoft's recent purchases of Affirmed Networks and Metaswitch.

Consumer services

5G will not provide any meaningful ARPU increase in 2021. 5G is not a 'game changer' for consumers. Many operators have still to demonstrate that 5G can significantly improve customer experience, at least in part because coverage is limited. In a period of increased economic uncertainty, consumers will probably be less inclined than previously expected to pay more for 5G and will be wary of signing up for long contracts. In 2021 and beyond, operators will rely on the development of content and services that push performance requirements and stimulate demand for better connectivity. They are not there yet.

Operators will focus on fixed–mobile convergence (FMC). The relative strength of fixed broadband propositions compared to mobile during the pandemic and in its aftermath will lead operators to link their services closer together in their consumer retail strategies. FMC can provide resilience to operators in developed markets. In emerging markets, low-cost fibre roll-out, good take-up rates and solid ARPU will intensify the interest in fixed broadband and convergence.

OTT video service providers will build on the successes of 2020. Trends that accelerated during the pandemic will continue apace. Major OTT video providers will continue to launch new services and expand geographically, which will increase the average number of services taken by individual users. Revenue from OTT video services will increase by 17% but traditional pay-TV revenue will stagnate. More operators will roll out 'aggregation-only' bundles of OTT video and telecoms services to capture some growth but consumer interest will be limited.

Business services and IoT

A major mobile operator will buy one of the IoT market disruptors. More than 30 innovative providers have shown that there is a market for IoT connectivity that is cheap and simple to acquire. 1NCE, for example, sold over 5 million SIMs in less than 2 years thanks to its simple pricing plan and sales model, including online sales. Operators have so far failed to provide an answer to such offers, but at least one major operator will respond to this threat in 2021 by buying one of these players.

Enterprise revenue for some operators will suffer a second dip. Revenue for operators' enterprise divisions typically fell in 2020, but by a relatively small amount (in the –2% to –4% range) as government funding helped to support companies that would otherwise have failed. More companies will stop trading in 2021 and the remaining ones will review their costs, which will have another negative impact on enterprise revenue for some operators. This may mask some changes in revenue make up – IT services are doing much better than connectivity. For some operators, IT revenue accounts for almost 50% of enterprise revenue. Cybersecurity, in particular, will grow in importance for operators.

5G services for enterprises will finally start to emerge. The B2B market is commonly cited by operators and vendors as being central to the 5G business case, and yet B2B offers built on 5G capabilities are still rare, even though 5G networks have now been launched. This should change in 2021. 5G back-up for fixed services (for example in SD-WAN solutions) will become prevalent and more standalone 5G products for enterprises will be launched.

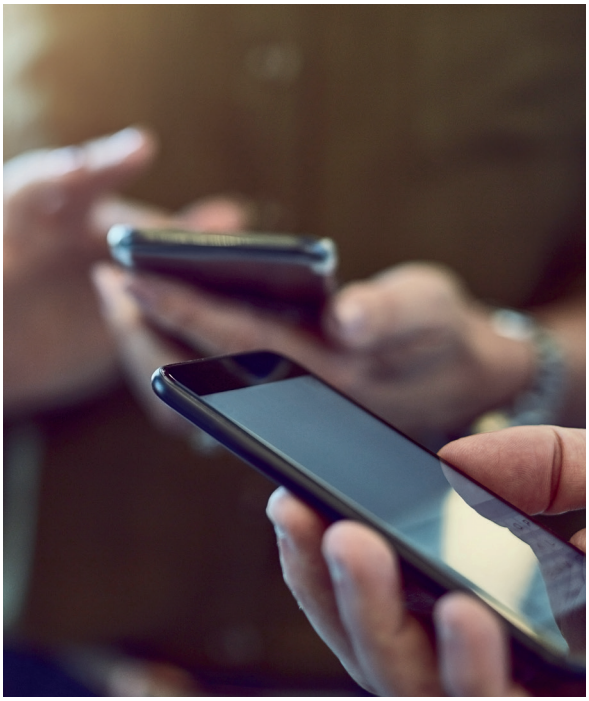
Telecoms networks and software

Operators' automation efforts will gain momentum. Operators' automation efforts are already eliminating staff from routine work. Following their experiences during the pandemic, operators will accelerate their efforts to support consumers with automated attendants and self-care apps. Operators will also apply this effort to the network in 2021. We expect them to increase their spending on the fully automated orchestration required by 5G core virtual networks from USD4 billion in 2020 to USD20 billion in 2025.

Non-traditional players will increasingly own telecoms infrastructure. There will be more structural separation in fixed networks, with many operators divesting fibre assets and with private equity investors piecing together wholesale FTTH networks. At the same time, web-scale companies will expand their investments in international data centre interconnect, including undersea cables. Finally, owners of passive infrastructure such as telecoms towers will be looking to move up the value chain, including into interconnect and edge computing.

Operators will move beyond the new radio investments that dominated 2020. Operators will take more steps to prepare for anticipated demand from enterprises for 5G services. These steps will include more partnerships with cloud service providers and the first roll-outs of 5G standalone (SA) core networking, along with deployments of 5G charging and network orchestration systems. Many operators will establish edge computing capabilities to strengthen their positions.

Contact us to find out how these predictions may affect you and your business.



Questions?
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Neutral host models could create opportunities for investors in rural areas

Alessandro Ravagnolo, Principal, Consulting

Mobile network coverage is not ubiquitous, and mobile operators face pressure to roll out networks in scarcely populated areas

Mobile network operators are used to reporting their network coverage figures in terms of the percentage of the population, which can give the misleading perception that mobile network signal is ubiquitous across the country. However, the territory coverage is often far from complete and can be improved to include areas with low population density and areas at the edge of existing cells that have a poor-quality service.

Policy makers and regulators are making an effort to improve coverage. They are implementing spectrum licence conditions such as a requirement for the provision of high-quality connectivity along major transportation corridors and the extension of service coverage to specific remote municipalities with no or poor mobile signal.

Operators can reduce to cost of network roll-outs in remote areas by sharing infrastructure with their competitors

The revenue upside from extending coverage is limited: there is not much additional revenue to be gained through an increase in traffic or an increase in the number of subscriptions or paid-for calls. Retail competition and downwards pressure on mobile ARPU makes the business case even more challenging.

This puts the need to reduce the total cost of ownership (TCO) of the radio access network (RAN) into focus. This can be achieved by various means including by sharing infrastructure with competitors. Passive infrastructure sharing in remote areas offers a TCO reduction of around 20–25%,[1] which is substantial but not sufficient when it comes to rolling out in very remote areas. Active sharing offers a more compelling reduction in TCO of approximately 45%. It is therefore not surprising that we see more and more infrastructure sharing deals between operators via either active RAN sharing or national roaming (which is

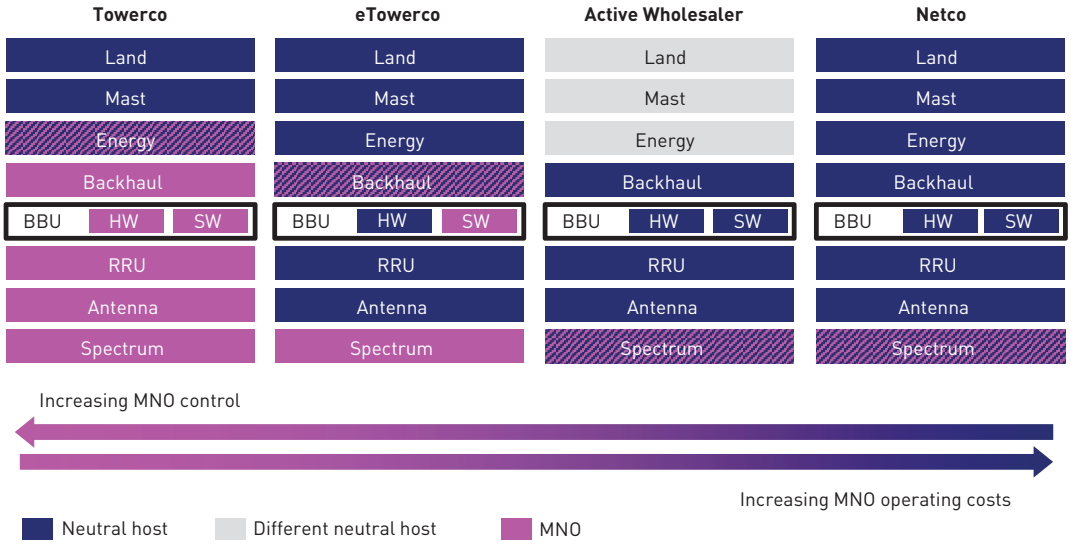

FIGURE 1: OVERVIEW OF THE PERIMETER OF SELECTED NEUTRAL HOST BUSINESS MODELS [SOURCE: ANALYSYS MASON, 2021]

similar to sharing in that it carries two operators' traffic on one network).

Neutral hosts can support operators with their rural roll-outs

Privately funded neutral host models can offer several advantages over operator-led initiatives. They can bring capex savings for cash-strapped operators, and can also be used to bypass arguments between the sharing operators if the benefits of sharing are not evenly distributed. Neutral host models also enable competition-preserving features of sharing deals such as the ability to differentiate on SLAs or to have different coverage/upgrade strategies.

The neutral host model can take different forms depending on the market context and mobile operators' appetite for surrendering control

Neutral host models can vary in terms of what assets are included in their perimeter of operations (Figure 1). Options include real estate, masts/towers, energy (equipment and management), backhaul (for example, fibre), base stations (the hardware and/or the software of baseband units (BBUs) and remote radio units (RRUs)), antennas and frequencies.

Operators need to accept the trade-off between reducing costs and retaining operating control over the network. Some have already started to back rural neutral host models in emerging markets (for example, Africa Mobile Networks). These players tend to be netcos that have adopted a coverage-as-a-service model and have control of active and passive equipment alike, but do not own spectrum. This model has not been used in developed markets yet.

The virtualisation of the RAN will offer new options to neutral hosts. Vendors currently sell base stations as proprietary solutions that include both hardware and software. In the future, the software will be decoupled from the hardware, which will potentially reduce both deployment capex and operating costs. The hardware can then be an off-the-shelf server owned by the neutral host, which will offer operators/tenants the ability to run their own software. This approach would allow mobile operators to further reduce the TCO of remote sites and yet maintain control of the most critical part of the RAN.

New rural deployments in Europe could be the ideal testbed for this business model as they represent a limited risk to operators. If successful, the model could be replicated deeper in the network. O-RAN is being trialled by several European MNOs in rural areas and could also play a role because it could further contribute towards reducing the TCO.

The neutral host model can easily be applied to other attractive use cases

Rural area roll-outs are just one of the use cases where neutral hosts can play a role. The evolution of mobile markets and technology offers compelling opportunities to investors that are bold enough to innovate and partner with operators to address market niches that are expected to rapidly grow in size, such as in-building solutions, private networks, specific solutions for railways and smart motorways and smart cities. Investors should consider how to monetise these opportunities from the start in order to build knowledge, relationships and a track record, and to avoid missing potentially narrow windows of opportunity.

Conclusions

Financial investors have the opportunity to support the roll-out of new connectivity infrastructure beyond the more-traditional fibre, towers and data centres. Strategic investors must continue to monitor technology dynamics and be responsive to their customers' requirements by experimenting and collaborating with them on new business models. Opportunities for investors stem from the expanding ecosystem, which includes private network providers, in-building solution providers, specialised neutral hosts, new hardware and software vendors and telecoms infrastructure service companies.

Analysys Mason has a strong track record working alongside strategic and financial investors in the mobile infrastructure space and has completed over 100 tower-industry-related assignments in the last 5 years. This includes work across the five continents, and in both developed and emerging markets. Analysys Mason has a 360-degree view of the mobile 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 to telecoms stakeholders.

[1] We have calculated the TCO based on the 20-year undiscounted cashflow assuming that two operators share the site. The savings may vary significantly by country. Cost inputs based are on project estimates.

Questions?

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Long-term planning is needed now for the universal postal, parcel and logistics services of the future

Ian Streule, Partner, Consulting

The last 9 months have provided an insight into the future of postal, parcel and logistics services, precipitated by COVID-19-related lockdowns, business closures and remote working. In future, consumers are likely to perform most transactions online; commerce will be delivered directly to the home or to a convenient click-and-collect or local parcel delivery point (PDP); and businesses will reduce the number of physical letters that they send to each other and to consumers. In addition, we will increasingly rely on regular, fast and convenient delivery services with limited human interaction. However, postal regulation in the European Union and the UK defines and controls universal services based on 20th century needs (including the weekday collection/delivery of letters and basic packages at a uniform price nationwide), with some differentiation being made between priority next-day and slow, multi-day services (as is the case in countries such as Belgium, Denmark and the UK).

The postal, parcel and logistics services of the future will be diametrically opposed to today's universal services, and long-term planning is needed to achieve a vision for 2030. This will be driven by:

- changes in volume
- users' needs for how and when parcels are delivered
- a new vision for the sector
- new universal infrastructure[1] and services.

Post and parcel volumes are changing

The volume of addressed letters sent has been in steady decline since the turn of the century, falling by approximately 33% per decade. At the same time, the number of e-commerce-driven parcels is growing strongly and at current growth rates it is likely to double every decade.[2]

In many countries at some point before 2025–2030, the number of addressed letters received by the average household will decline to less than the number of parcels received. This trend will continue beyond 2030 so that parcels will account for a dominant share of the postal, parcel and logistics sector, with letters forming only a minority share (25% or less of the market volume). Addressed letters will account for an even smaller percentage of market revenue. However, the addressed letter anchor service currently underpins the postal service USO in many countries.

Parcel delivery needs are evolving

E-commerce purchasers and parcel recipients are placing growing importance on same-day, next-day, tracked and conveniently delivered items. Recipients are also prepared to collect items from nearby PDP or pick-up locations and this may become the preferred choice as people return to city centre offices, leaving homes empty throughout the day. Improved tracking (down to the minute) provides certainty for consumers, but also drives dissatisfaction when a home delivery fails at the last stage (for example, the scheduled timeslot gets missed or pushed back, or the package is left on the (wrong) doorstep).

A future vision for the postal industry is needed

We expect a paradigm shift for the sector, but change takes time and effort from the industry, and consumers may also need to change their default behaviour around delivery locations. While there is a place for planning incremental changes, these are not a substitute shaping a longer-term vision. Preparations should therefore be made now to meet the requirements for 2030 rather than those of just the next 2 to 3 years. This will include support for the following shifts (illustrated in Figure 1):

- a letter USO that moves from the highest cost daily delivery service to a less frequent service, but retaining the convenience of delivery to the home
- a parcel USO that moves away from a combined delivery with letters to a service that focuses on rapid, regular delivery to centralised but convenient parcel delivery points, combining speed with tracking and technology.

Universal infrastructure and services

The deployment of a nationwide universal PDP infrastructure will be needed, which must be accessible for all users. This must include effective APIs for e-commerce, distribution

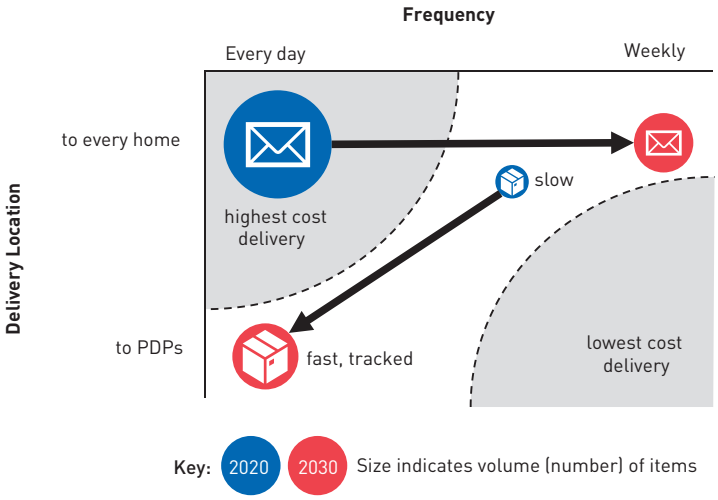

FIGURE 1: A VISION FOR POSTAL, PARCEL AND LOGISTICS SERVICES BY 2030 [SOURCE: ANALYSYS MASON, 2021]

points that are open 24/7 and within convenient reach, and that have enough capacity to be available without disruption. A key consideration for a universal, forward-looking parcel service is the extent to which the market will provide universally accessible, uniformly priced solutions. This varies considerably by country, according to the geographical areas with (less) economical costs of delivery. It is also unclear whether the market will (fail to) provide open access to PDPs for multiple carriers to support competition, and this is where a 'universal infrastructure' can assist. Services will need to be fast, next-day or same-day, and likely delivered every day. The industry may also find innovative adjacent services that can be combined with parcel delivery points such as e-grocery pick-up facilities.

Next steps

Some industry players are addressing these questions by conducting studies of user needs, as well as undertaking scenario analyses and policy development. However, the bigger challenge is to plan further into the future. The following two countries have indicated such a vision.

- **Ireland.** ComReg stated[3] that it is seeking the provision of a 'de-minimis' (that is, a very limited) USO.
- **Singapore.** The country has embarked on a government-led national infrastructure[4] deployment to provide ubiquitous PDP availability that includes carrier-neutral open-access principles.

Policymakers' long-term aims are likely to include ensuring that the industry provides universally available, uniformly/competitively priced and high-specification parcel delivery services. In addition, policymakers will want to ensure that these universal services operate with efficient, environmentally friendly logistics and much reduced but cost-effective letter services in order to provide the future economic and social glue[5] across all businesses and households. Finally, these services must be delivered with the resilience and reliability needed to safeguard social welfare and economic development. Analysys Mason can assist with this long-term planning now.

For further advice, please contact Ian Streule, Partner, Consulting. Additional information on the anticipated changes in the postal sector can be found here on the Analysys Mason website.[6]

[1] Universal infrastructure refers to nationwide, universally available physical installations (including associated electronics and operating software platforms) that are deployed and maintained as necessary for ubiquitous physical delivery requirements.

[2] Data is taken from UPU and regulatory authorities in typical European markets.
[3] Commission for Communications Regulation (20 December 2019), Postal Strategy Statement 2020–2022. Available at: https://www.comreg.ie/?dlm_download=postal-strategy-statement-2020-2022-2.
[4] Locker Alliance. Available at: https://www.lockeralliance.net/.
[5] A concept introduced by Richard Hooper for the universal postal service in 2008. For more information, see 'Saving the Royal Mail's universal postal service in the digital age' (September 2010). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/31808/10-1143-saving-royal-mail-universal-postal-service.pdf.
[6] Related articles on the Analysys Mason website include the following:
- Finding a converged communications strategy for telecoms and postal services;
- Measuring the mail: how to ensure statistical accuracy for postal sector operations and regulations;
- The rate of change for communication sector USOs: it's a question of time
- New Year, new postal USO?

Questions?

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Foodtech is vital but difficult, and the market is fragmented: all stakeholders need to do more

Maria Tunberg, Principal, Consulting

The world's population is growing, and food demand will have increased significantly by 2050 compared to 2016.[1] The food supply chain is currently responsible for 28% of total greenhouse gas emissions and this share is increasing rapidly.[2] Tackling these challenges requires technical innovation and has given rise to a growing foodtech market that offers precision agriculture, smart urban food solutions, and supply chain transformation leveraging sensors, drones, AI and cloud technology. Many foodtech innovations allow for improved resource efficiency of the agriculture industry[3] but are each dependent on increased technology adoption and reliable connectivity, which may be challenging to achieve.

There are several challenges on the road to smart and fully connected farms

In a recent study, Analysys Mason shed light on some of the key barriers for smart, connectivity-based solutions in the agricultural sector. They include the following.

- **A diverse ecosystem: on the demand side, there are many different stakeholders in the agricultural ecosystem.** They include, but are not limited to, government and agricultural policy makers, regulators, suppliers such as seed and fertiliser companies, original equipment manufacturers (OEMs) that design agricultural machinery and vehicles, and agricultural consultancies. Navigating the ecosystem and addressing the requirements of multiple stakeholders is complex.
- **A fragmented supply chain: the agriculture supply chain is fragmented and characterised by many small companies and only a few large ones (for example, John Deere, Monsanto).** The many small start-ups that characterise the growing foodtech industry are creating innovative solutions but it is difficult for connectivity and solutions providers to identify technology partners and routes to market.
- **Scalability: there are national variations and differences in regulations to address.** The structure of the market in each country differs; some are formed of a few large commercial farms, others of numerous smallholdings. Governments may have established quota systems or subsidies, which by their nature may undermine the incentive to increase productivity and hence adopt new technologies.
- **Connectivity: the agricultural sector has diverse connectivity needs to support mobile and static applications, both indoor and outdoor.** Operators have already started to deploy narrowband networks (for example, NB-IoT and LTE-M) but 5G is required for more advanced use cases such as autonomous farm equipment. However, much of the world's food production is in rural areas, which are a low priority in operators' roll-out plans.

Analysys Mason is working with stakeholders in the foodtech industry to address these challenges in Sweden

By providing expertise and connecting the stakeholders, Analysys Mason is helping to facilitate cutting-edge innovation for a digital bioeconomy.

- On behalf of the Nordic Council of Ministers, Nordic Agri Research and Nordic Forest Research, Analysys Mason was commissioned to investigate how the Nordics could take advantage of the digital transformation that is reshaping the agricultural and forestry sectors. Based on a policy overview and an international multi stakeholder workshop, a decision was made to establish a Nordic network of testbeds supporting a digital bioeconomy. Analysys Mason facilitated this process over the last few years and has coordinated and grown the network, which today includes cutting-edge innovative test environments such as for connected animals and precision farming.
- Together with researchers from the Swedish University of Agriculture, Analysys Mason initiated and managed a pilot study to explore the development of smart urban agriculture (initiatives where food is produced in closed, controlled and digitally augmented environments, such as vertical farms, plant factories and aquaponics systems). The report highlights that food production–consumption systems are excluded from high-level policy agendas on smart cities and digitalisation, suggesting that institutional arrangements (for example, food policy and urban planning) are constraining development and take-up of smart urban agriculture.

- Analysys Mason has been appointed to evaluate and support a regional state-funded initiative Foodtech Innovation Network in the south of Sweden. This multi-stakeholder initiative (including researchers, public bodies and private sector representatives) will run for 3 years (2020–2023) and aims to support the development of a vibrant foodtech community including the establishment of new, and growth of existing, foodtech firms.

The foodtech industry is immature but evolving rapidly, and policy makers have a key role in facilitating new technology

Driving innovation in the foodtech sector requires a multi-stakeholder approach. Researchers need access to funding, end users and testing environments. Farmers need to have incentives to adopt technology that improves productivity and reduces greenhouse gas emissions. Farmers and other companies in the agriculture sector need help navigating current and future technology and connectivity options to overcome concerns about investment, expected benefits and data security.

[1] Elferink, M., & Schierhorn, F. (2016). Global Demand for Food is Rising. Can we meet it. Harvard Business Review, 7(04).
[2] Poore, J., & Nemecek, T. (2018). Reducing food's environmental impacts through producers and consumers. Science, 360(6392), 987–992.
[3] World Economic Forum (2018). Harnessing artificial intelligence for the Earth. http://www3.weforum.org/docs/Harnessing_Artificial_Intelligence_for_the_Earth_report_2018.pdf.

Questions?
Please feel free to contact Maria Tunberg, Principal, Consulting at maria.tunberg@analysysmason.com

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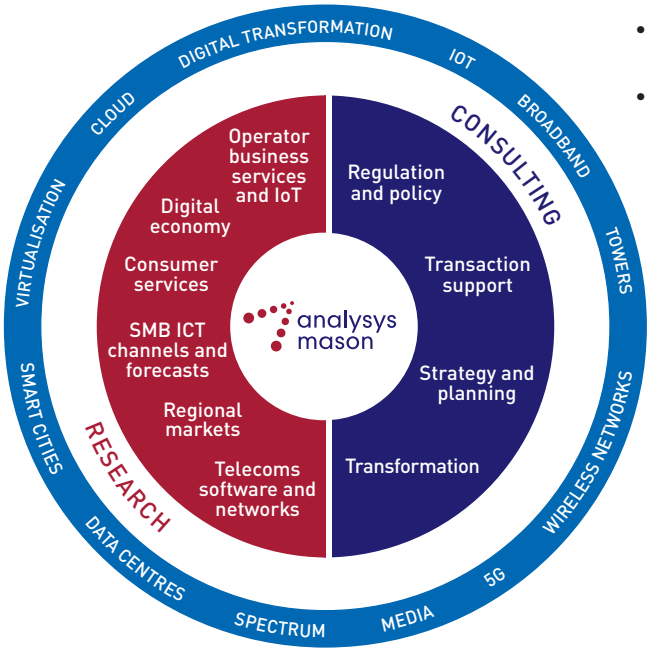

About our services

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.

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- We are future-focused and help clients understand the challenges and opportunities new technology brings.

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- 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.

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