Forging A New Identity For Telcos

Executive discussions on solving the key challenges the industry faces.

A TelcoForge Leaders' Meeting Report

September 2025
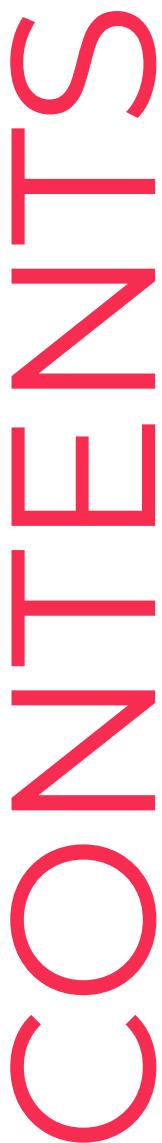
CONTENTS

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INTRODUCTION

TelcoForge is holding monthly meetings mainly for C-level and SVP-level professionals from as diverse an array of stakeholders as possible. These meetings take place under Chatham House Rules to enable senior professionals to speak frankly. However, we capture the anonymised ideas and outcomes for the wider industry to digest and act upon.

During the last few months the Leaders' Reports have highlighted some of the dissatisfaction and structural problems prevalent in the telecoms market. Executives have expressed concern about a range of increasingly fundamental issues which hold the industry back from solving their more apparent problems.

As a result, we invited our leaders to engage with the question of how we go about solving some of the most critical challenges.

- What are the most important areas to address?

- What aspects can be effectively changed?

- What will it take to revitalise the telecoms industry?

In August 2025, over the course of two one-hour calls, around a dozen executives from different parts of the industry and different continents shared their insights.

This paper makes no pretense to provide a complete set of answers to the challenges faced by the industry. However, it highlights the perspective of senior executives and illuminates their priorities..

Some of the conclusions are complementary to our previous reports and may at times refer back to them. You can find other reports freely available to access at https://www.telcoforge.com/reports

EXECUTIVE SUMMARY

"Telecom's a bizarre hybrid stepchild of capitalism."

The industry, and certainly the telecom service providers who form the purchasing base of it, is neither fully market-driven nor fully driven by governmental and societal priorities. We want a competitive market and dynamic players within it who can deliver returns to shareholders and low prices to consumers… but those players are also charged with maintaining critical national infrastructure and delivering reliability and security. This leads to a tug of priorities and an identity crisis at the heart of the telecoms industry.

In itself this would be enough to make a company move slowly and make careful decisions about what risks to take and in what markets. However, those industry challenges are compounded by the rise of software and artificial intelligence which promises a great deal, but where the market moves with a speed that telcos are structurally ill-equipped to capitalise on.

What can or should we do about this?

In August 2025, TelcoForge spoke with a group of telecoms executives from diverse backgrounds and expertise across technology, operations, infrastructure, satellite and more. Their thoughts and suggestions have formed the basis for this report. However, they were speaking confidentially under Chatham House Rules. While the quotations in this document are authentic, they are unattributed.

The report follows discussions (in greater or lesser depth) across six critical areas:
- Workforce renewal
- Regulatory reform
- Intellectual property
- Policy and government
- Business model innovation
- Market structure

The issues raised also led to debates over whether the telecoms market structure should also change in order to lessen or resolve that identity crisis, and could it do so in a way which supports competition and innovation at all levels.

Without decisive action, the telecommunications sector risks becoming increasingly marginalised – and potentially replaced in function, if our previous report proves accurate - as technology giants and emerging players capture the value being created by digital transformation.

This report also summarises and collates the key risks, implicit or explicit recommendations, and suggests possible next steps to break the industry out of its current position.

WORKFORCE RENEWAL

Perhaps the most pressing challenge facing the telecommunications industry is its aging workforce. The demographic reality is stark, with one executive acknowledging: "There's a certain natural progression of the industry that might be interesting to frame, where in 10 years' time all of us on this call probably won't be doing this anymore, and we represent maybe 80% of the existing leadership population."

Data supports these concerns, showing that the share of older, more experienced telecommunications workers (ages 55–64) increased from 7.2% to 16.7% over recent decades.

This demographic shift coincides with automation initiatives that paradoxically reduce opportunities for younger workers to gain hands-on technical experience.

"Let's say these people become engineers and technologists and they want to work in telecoms. On the other hand, these telecom companies, and operators especially, want to automate everything. They want to show they are working with younger people, but those young people can't do any of the technology related things because we are automating everything."

The challenge extends beyond numbers to fundamental questions of industry definition and appeal. As one executive asked:

"How do you define telecom? I was in a side session at a conference and there were a lot of grey-haired people discussing 'What is telecom?' and the conclusion they reached was that telecom is just another name for connectivity. I actually had a different take… If we can't explain to ourselves what telecom is, how do you explain it to younger people?"

The risks that this situation creates in terms of losing institutional memory is very real. While some skills can be transferred from other industries, there is a base of generational knowledge and information which is fundamental to the telecoms industry. At present, even seasoned experts are finding huge amounts of new skills to learn even while retaining older knowledge.

This is not, in fact, a problem unique to telecoms. The Oil & Gas industry faced a similar situation a decade or so ago. However, the solutions that are adopted within companies facing these problems can themselves lead to further issues down the line.

Companies that rely on vendors for managed services will, of course, expect their vendors to maintain sufficient knowledge and skills. However, that only increases dependencies which may not serve the best interests of the operator, while it does nothing to preserve knowledge within other parts of the business. Moreover, vendors tend to gain and upskill their staff through similar channels to the telcos. With those channels dwindling, ultimately it might shuffle some responsibility for failures onto other shoulders… but inevitably the cost of doing so will be taken into account in contract negotiations.

Meanwhile, other companies are navigating this transition by focusing on modern technology stacks:

"My team members working on the Kubernetes stack are all 20 to 27 years old. I no longer work for telecom; I'm working for a mobile operator, but it's now five years that I'm only on cloud, so I can work for any enterprise working with cloud and cloud technology."

This example illustrates a crucial insight: talent often follows technology rather than industry labels. Professionals increasingly identify with technological domains - cloud computing, artificial intelligence, edge computing - rather than traditional industry boundaries.

The downside is that it will be a huge lift for most companies to get past the challenges of legacy networking. The investment required is substantial and involves retaining and reskilling in itself. However, as a multi-year program it might offer value both to create a more flexible network ecosystem and align the skills available in the market much more closely with requirements within the telco.

The good news is that women accounted for only 37% of the global telecom workforce in 2022. That might sound like bad news, but it suggests that there is significant untapped potential.

Companies such as enterprise fibre provider Vorboss have been actively recruiting in-house and are aiming at a 50-50 gender balanced workforce by 2028, including in traditionally male-dominated areas such as fibre engineering and laying. However, that has required them to adapt some of the existing approaches to suit; for example, adapting some of the tools to a smaller average hand size. The company also has significant in-house training facilities to support new entrants into the industry of whichever gender.

The approach runs contrary to the outsourcing models used by telecoms providers. However, it is important to note that outsourcing has not eradicated the need for expertise within the telco. While vendors might run the managed services, internal staff still need to understand the diverse technologies and systems involved so that they can ensure the proper delivery of services.

Ultimately, while there are multiple possible avenues to take, the problem is one which needs intentionality in its answer to avoid backing a company into a corner. One executive summed it up neatly:

"As we all retire at best or die at worst, I think there will be a natural transformation that happens, because somebody has to replace us. I think the question is what replaces us and who."

REGULATION

The telecommunications industry faces a fundamental contradiction. As one executive noted:

"On the financial piece, they sweat the assets, they don't take any risks. But on the other side, when occasionally they actually do something they are very much in the regulatory straitjacket about how quickly they can act. I don't know how much these three end up reinforcing each other: the regulator, the finance side and then telco's own culture."

Regulatory frameworks designed for monopoly-era telecommunications continue to constrain operator flexibility in competitive markets. The following example illustrates this problem perfectly:

"I think regulation does probably play a bigger impact than I thought, and that goes with telco culture. Example one was BT trying to turn off telephone exchanges and get out of the PSTN network, but they have these very strong regulatory requirements. So BT's got 5000 exchanges that it wants to turn off. It only got approved to turn off 100. It can't just turn them off because the government says, 'There's one man in a village in the middle of nowhere that relies on that exchange, so you're not allowed to turn it off.'"

This is very much the product of a particular mindset. After all, there are other solutions to this problem beyond a simple yes or no.

"There obviously should be a way to give an alternative mechanism, maybe a cell phone or something, but we get locked in."

Image by Pexels

A financial analyst might even propose helping certain people relocate if the cost was less than maintaining the PSTN network. Suffice it to say that different professionals would come up with different approaches to the problem. However, a regulator might reasonably respond that their role is not to haggle on behalf of consumers but to arbitrate on what telecoms providers cannot do if it will harm the public provision of services.

The regulatory burden extends beyond operational constraints to cultural impacts. One executive highlighted the broader implications:

"Since telecoms is so regulated, can they escape the cage of regulation? I don't really know what telecoms is in five years' time, but people who aren't labelled as 'telecom' have a lot more freedom, it feels, to experiment than people who are in the base telecom category."

REGULATORY LAG

The fundamental issue is that regulatory frameworks haven't adapted to technological evolution:

"We've abstracted the physical network from the service, which wasn't the case before. And I think a lot of our current regulation is still locked in the days when the network and the service were the same thing. And today that's no longer the case."

Note that this point might reasonably be made regarding some areas within the telecoms industry itself, where – for example - advertising claims are often based on network coverage compared to other companies. However, this regulatory lag creates particular challenges when technology intersects with critical services:

"There were two people that died in the UK because their telehealth system stopped working [during the 2024 switchover from analogue to digital communications]. It was very clear that they weren't BT customers, but the government said that they need to be end-to-end responsible, so that all the things above the network carry on working."

The result is confusion about accountability and responsibility, and ultimately this goes back to what a telco fundamentally is or does:

"There is a strangeness in the aspects of what the telecom industry is accountable for or not, and how much the telecom industry is an independent capitalist endeavour or a government institution to provide basic infrastructure."
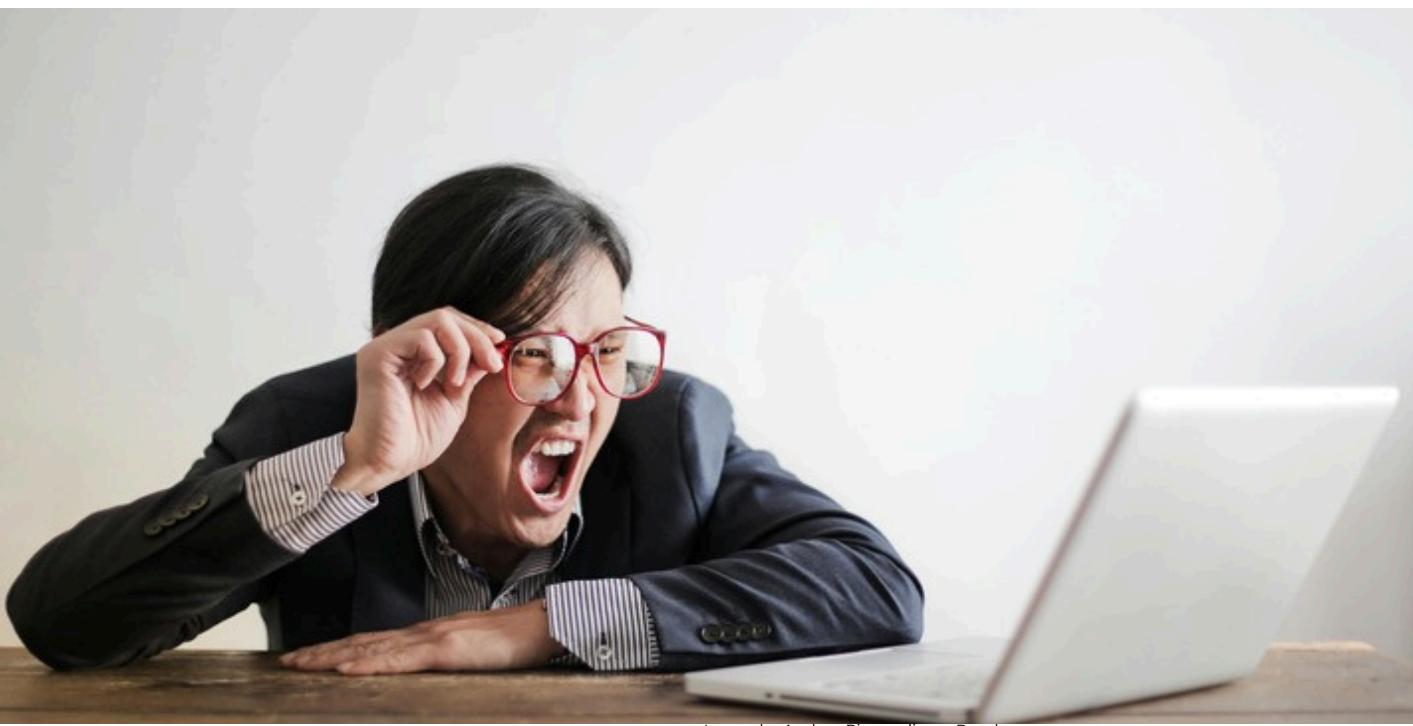

Image by Andrea Piaquadio on Pexels

PLUGGING THE GAP

The knowledge gap within telcos is also to be seen within regulators. This is perhaps unsurprising as they are much smaller organisations without direct hands-on experience of the industry. If a national-scale telco struggles to manage the implications of terrestrial and satellite networking, competition dynamics across networks and services, the app economy, the role of the internet and now AI, it's hardly surprising that regulators will do too.

However, that can lead to inertia of its own in cases where decisions are being referred to regulators for adjudication. One of the executives observed the difference in time-scale of response between different regulators, noting that some can be relied upon to provide an answer after a while, while in other cases "It's just crickets".

"Maybe the thing is that the staff at the regulators don't understand the technologies and that's why they're struggling to make regulatory decisions."

Unsurprisingly that leads to recruitment from within the telecoms service providers and vendors. However, that too carries its own problems of welcoming a poacher turned gatekeeper. While the recruits might have spotless intentions going into the regulator, inevitably their outlook is shaped by the environment they have operated in. As a result, they tend to be influenced by the paradigms and limitations in outlook which the operators and vendors experience.

In this context, Nigeria represents an interesting experiment:

"Nigeria has actually made an announcement that they're putting a pause on private sector individuals moving into regulatory roles for a period of time. So for example, if you're an executive team in South Africa, you're not going to be able to go to work with the NCC for, I think it's a three- or five-year period to give a bit of a regulatory break and stop some of the corporate influence coming back into the regulator."

Photo by Element5 Digital

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HARMONISATION CHALLENGES

Regional regulatory fragmentation creates significant barriers to innovation and deployment. As one executive reported:

"The biggest issue we have in Middle East and Africa is regulatory harmonisation. I operate in a market with 70-odd countries across the entire region, and probably 80% of them have different regulatory views on pretty much everything. It makes it quite challenging when you're trying to enter new markets and the regulatory environment is so vastly different."

While there are unquestionably efforts to coordinate regulation across different blocs, countries can also view regulatory differentiation as a competitive advantage. As a result, it is unrealistic to expect complete harmonisation on regulation.

Perhaps, however, there are philosophies to regulation that could help countries converge on some areas of consensus. Rather than expecting a single 'standard' as with technology, we might have regulators globally lay out five or six possible ways to manage a question (and the basis for those positions), and then have countries select the appropriate option for them.

This would simplify operations for the market compared to the status quo, while also enabling choices for each country. It would also encourage proactive planning for issues demanding regulation, would encourage regulators to clarify their positions, and would simplify the process for those regulators who don't have confidence in their in-house knowledge base for decision making.

For example, one executive advocated for a pragmatic regulatory philosophy which some markets - but certainly not all - might agree with.:

"I tend to be a supporter of less regulation until it starts to kill people, and then you have to put some back."

Image by Christina Morillo on Pixabay

INTELLECTUAL PROPERTY

The current intellectual property regime can offer significant barriers to telecommunications innovation. While there is clearly a value in managing patents and intellectual property, the current system creates challenges for innovators.

The fundamental issue lies in the way that intellectual property processes apply today. Standard licensing promises often prove inadequate:

"I have seen countless scenarios where somebody says, 'We'll give you that under a fair, reasonable and non-discriminatory [FRAND] license.' Then you spend millions of dollars building prototypes, and then you find out just how unreasonable the 'reasonable' licensing terms actually are, which sucks up all the profitability of the thing that you're trying to build."

The current intellectual property environment creates uncertainty, the outcome of which can be direct and substantial. While inventors want to be recognised and paid for their work, it can sometimes be difficult to know what is patented, by whom, and under what terms their IP can be used.

While this is clearly a problem for companies creating products that either deliberately or coincidentally connect to third parties' intellectual property, the patent holders themselves can easily lose track – in which case, it's hardly surprising that unassociated third parties might do the same.

"I have discovered an unfortunate downside of them is that I've been subpoenaed on some patent that I had 12 years ago with the company I no longer work for and no longer have any records for."

So what is the answer?

"Tort reform, or some changes to intellectual property law where you don't allow a company to hold your innovation hostage because one little corner of it might possibly infringe on an IBM patent made 18 years ago. You don't want that to be the millstone around the neck of people who are trying to do innovation."

POLICY AND GOVERNMENT

Telecommunications infrastructure development requires close collaboration with government, but different countries and regions have very different approaches for how to manage the relationship between government and industry. One executive highlighted the contrast:

"They're so bloody badly organised in Europe. Actually I am a great supporter of the American government's relationships, whether it be with IBM or whether it be with other technology vendors, a big Internet provider, hyperscalers, because I think it does help the government create policies that are well informed, that actually then create the conditions for innovation and growth."

Successful models also exist elsewhere:

"If you want to look at other governments that do that really well - Japan, China, some of the other South Asian countries - you will see that there are great examples of private-public enterprises or private-public policy systems that actually galvanise the innovation and pump it into the industry in a much quicker way. So I would encourage that."

IINFRASTRUCTURE INVESTMENT

Government policy plays a crucial role in infrastructure deployment, but execution often falls short, not least because government policy can be a fickle thing. One executive highlighted the American challenge:

"When we think of how BEAD funding of $42.5 billion gets wrapped up in government processes, changes of administration and changes in policy, we get a very slow rollout. I think there is something like 60 million homes still not passed in the US with a decent fibre connection. That's a bloody joke. Most of northern Europe has had fibre passed five years ago."

And this, we observe, from a region that is 'bloody badly organised'. Perhaps it would be fairer to say that the coordination between different policymakers and regulators across that region is lacking – a parallel phenomenon to the lack of regulatory harmonisation we heard about across Africa and the Middle East.

The disconnect between policy intent and execution reflects systemic issues in programme design and implementation. However, an injection of competition tends to galvanise the market. One executive observed:

"What happens if regulatory agencies come to you and say, 'OK, we want you to have 95% homes passed full fibre coverage within 10 years. And if you don't have it done by the 11th year, we'll do it with the municipality as a direct competitor to you.' What you try to do is give them incentives to do it first. And if that doesn't work, then you give them threats of what happens if they don't do it."

This is clearly not something which incumbents will find desirable. However, "There's this interesting game theory that all plays into this," as a number of participants noted.

Indeed, this policy of supporting competition seems to have been effective in several cases.

"The UK was definitely a laggard in fibre. But then they started really funding the altnets. And so now there is a lot of competition and going from being a laggard, there will probably not only be one fibre coming into your home. In many cases, you can have two or even three fibres coming to your home."

What is perhaps worrying, though, is that competition against regulated telecoms players can come from non-regulated players in other industries and has at least as much effect:

"The most advanced technology on the submarine cable side is coming from the big Internet companies. There's massive dependency on those connections and they're really innovating like crazy."

If you think that would not apply closer to home, think again:

"We used to work on the Google fibre stuff when I was in Ericsson. Google innovated on the machines that lay the fibre, because they were frustrated how slow they were. So they made new machines that lay the fibre fast. But the net result of that really was not them wanting to be a fibre provider, it was them making AT&T and Verizon worried about that competitive threat of displacement. And then suddenly AT&T and Verizon started investing in those cities. Google just had to show an interest and suddenly the fibre appeared from the incumbent."

Game theory in practice once again. It is important to surround this kind of activity with caveats, though.

While governments or hyperscalers might find this approach useful to stimulate investment from the telecoms world, it is also worth noting that this may have diminishing returns. While major telcos do have the resources to make heavy investments to protect their business, doing so pulls resources away from other priorities including transformation and innovation programmes and drives an emphasis on cost-saving elsewhere in the business. Once again we come back to the question of how much the telco can and should act as an artifact of the state versus being a commercial entity.

BUSINESS MODEL INNOVATION

Traditional telecommunications business models face fundamental sustainability challenges. The industry's core products increasingly resemble commodities, making it difficult to raise prices while facing continued infrastructure investment requirements.

Participants were keen to explore alternative approaches to the historical revenue model:

"If you look at the major over-the-top vendors today, they don't actually make money off their primary service. In other words, Google doesn't charge you for search, Meta doesn't charge you to share your videos. They make money off derivative revenue, predominantly advertising. But anyway, if you just charge for the fundamental pipe, are you ever going to be profitable? Maybe give the pipe away for free, and you make the money on something else,"

While a nascent telecom API economy might not replace the revenues from B2C subscriptions, it is certainly a first step to make money in a different way from networks. However, the separation of network infrastructure from service delivery creates entirely new opportunities for business model creation. One executive outlined the position:

"When telecom first started, it was treated as a vertically integrated industry. Every single innovation that's happened since has built horizontal platforms to accelerate different levels of innovation above and below, and each one of those platforms has a completely different investment model, timeline, pay back, and return on capital."

We can see this in the case of, for example, the lifetime of a fibre-optic cable or a mobile phone tower compared to the lifetime of a mobile handset or an iteration of ChatGPT. The current approach fails to properly account for and optimise upon these differences:

"I don't know if part of our problem is we still treat telecom as being this one industry, when in reality there's a model that says 'How do I invest in my real estate business? How do I invest in passive infrastructure? How do I invest in active infrastructure? How do I innovate on services?' Something ridiculous like 95% of the annual telecom operational budget goes to keeping the infrastructure lights on. There isn't any money left to do anything smart, but obviously the money that's innovating at layers above has a very different risk profile and lifetime. It's completely disconnected."

To properly leverage these differences and deliver optimal results from the different layers of the ecosystem might well entail a different business structure in future, where we have completely different entities operating in the different layers. The emergence of "infrastructure-as-a-service" models exemplifies this kind of evolution path:

"I think it comes back to the conversation around whether or not the entire network is going to be outsourced. And we've seen it in the network-as-a-service businesses like Nuran in Africa, and we've seen managed services contracts taking place across the globe with the likes of Ericsson and Nokia and Huawei and ZTE managing the actual core network on behalf of the operators."

"Take it a step further and outsource the entire network. Have a core-as-a-service type business setup that runs the core network through an AWS datacentre or whatever, and then the telco basically just keeps the services and billing relationship with the customer. And I think that could be a very efficient way of running the networks moving forward, because then each player has their specialty."

We have seen this with 5G networks in some countries, either completely or in particular parts of the country:

"It's the vendor who owns the infrastructure, and then they have a commercial relationship then with the MNO. On a usage basis, a throughput basis, whatever that commercial model looks like, I don't know, but that's the way I see developments moving forward."
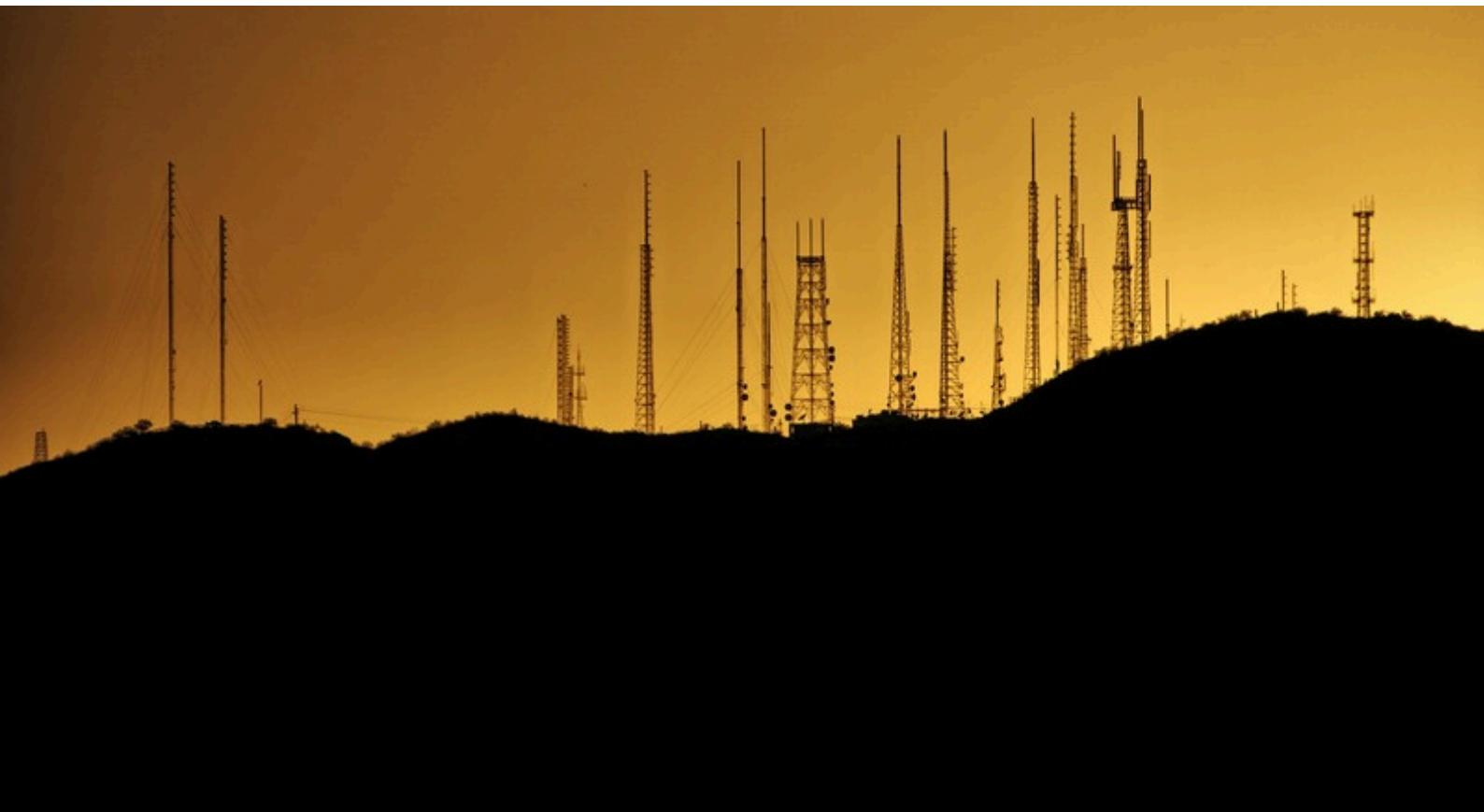

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VALUE BEYOND CONNECTIVITY

Telecoms companies possess unique assets beyond basic connectivity, but regulatory constraints limit their ability to monetise these assets. In other reports we've explored how the telecoms industry missed out on the potential of location-based services in 3G, but that is not the only missed opportunity:

"One thing I think which telcos blew was caller ID. The whole point about caller ID is it gave you some verification of who was calling. Allowing people to fake caller ID was just a complete disaster, because you removed a huge value out of something that only the network itself should be able to provide."

That question of caller identity, and the trust it engenders, is a missed opportunity... although perhaps not an irreversible one.

"If you think about voice, it's one of the most failing services from an operator. Who picks up the phone if they don't recognise the number nowadays? Nobody, right? So it is a failed technology in the current state because AI has scared the living bejesus out of everybody and their nan simply because they don't know actually who is on the other end of the phone."

This example illustrates broader challenges with service provider identity. In 2G the value was clearly in the ability to make telephone calls and send messages, with a company that was – as mentioned above – vertically integrated. That is no longer the case.

"I think operators as a whole still haven't figured out what their longer-term strategy is and why they add value to the world."

Picking up on the complaint above, one argument might be that telecoms providers can re-engender that trust – not just in voice communications, but in a wider set of digital applications thanks to the potential of telecoms network APIs. According to the GSMA, identity verification is one of the most-used APIs so far. Early days for their Open Gateway project still, of course, but potentially noteworthy.

The ultimate vision requires fundamental restructuring:

"In the end you will need an infrastructure designed such that connectivity goes for free. Connectivity has to be offered for free and then you need to have the value added on top. That's the mindset we need to have."

MARKET STRUCTURE

The competitive landscape faces potential disruption from technology giants. As mentioned earlier, we have seen hyperscalers enter parts of the telecoms industry as a prompt to encourage activity from the existing players. The reason why this works is because the threat is credible, at least in terms of the financial leverage. As one of the executives suggested,

"Why can't we let Google buy up all the local telcos and do something with those resources? Why does a British Telecom have to be government regulated? Why can't Amazon own a piece of that and integrate?"

However, such consolidation raises complex competition concerns:

Photo by Mohamed Mehdaoui on Pexels

"The problem of course, is that if an Internet company with lots of content and lots of information processing capabilities owns the access part, the broadband access network, then they can preferentially encourage people to use their services. Of course Microsoft and Amazon are going to cry foul if Google owns an access network and it's cheaper to get to the Google cloud than anybody else's cloud, that's a problem."

Indeed, without active competition management there could be more severe problems. As one participant responded,

"I think it's less the case that if Google owns your access network that Microsoft wouldn't get preferential treatment. I think Microsoft would get no treatment."

It is clear that there needs to be government intervention, then, to enable competition on the delivery of services no matter who is delivering that. However, as noted earlier, the structure of the industry has become much less vertically integrated over time. So we put a question to the assembled executives:

Would a sensible next evolution of the industry separate off the highly-regulated national infrastructure, which can ensure good coverage everywhere, from service companies that can operate on a much more agile and commercial basis?
Then each part of the industry can play to its strengths... and perhaps even overcome the difficulty of serving two masters.

The answers were mixed, but insightful.

UNTANGLING THE MARKET

The overall feasibility of disaggregating the market was the first question to be debated.

"I think a lot of the dynamics here become interesting when you look at some of the other mission-critical infrastructures like electricity and water and things where there is a generator model, a wholesale model and a retail model."

As a market structure, that seemed to gain some interest and traction.

"We do have this with electricity, where we've disaggregated the producers from the generators from the transmitters. So I do think it can work."

For those of us alarmed at the comparison of the telecoms industry with utilities, you're not alone. However, there are two reasons why a complete disconnect of infrastructure and service might not be feasible in practice.

Firstly, the integration challenge is substantial.

"You're talking about the dumb pipe model and you're talking about potentially federalising, or socialising in some sense, the access networks. Not sure that that's the right answer, because the access network needs to be intimately tied with the knowledge processing that it supports, with the data that it carries, with the content that it distributes, with the artificial intelligence global mind that's eventually going to be built."

More on this a little later on, as the question of how we deliver technology-based services is a key one.

The second challenge lies in maintaining incentives across the value chain:

"I don't see there's a lot of incentive to really maintain the dumb pipes. I don't see there's an incentive to innovate or improve the capacity, performance, reliability of those dumb pipes, because all the profitability is on the knowledge side."

Is that necessarily the case, though? Or is this a reflection of how the current system works? If it's the latter then we could conceive of different business models taking off.

"Think of my water company. Just suppose somebody built pipes and said, "You can actually get water from different companies," you might think "That doesn't make sense." But somebody might be able to sell me soft water, somebody might be able to sell me hard water, and they both have their own advantages and disadvantages."

While this might be logistically difficult for water companies, it's much more straightforward when we're looking at bits and bytes. What is more, things become very appealing if we turn our mental model around. Instead of trying to work out how one infrastructure company could improve its services by carrying multiple clients' traffic, think of how a client unrestricted by one network might value that access.

"We don't have connectivity everywhere. If I have good connectivity at home, it might be poor where I work, or vice versa. For me, I don't mind paying £10 extra or £20 extra if I can get connectivity everywhere, or a better connectivity even when things are congested."

In other words, telecoms service providers could really start selling telecoms services, not competing based on their own networks. This is exactly the kind of scalability and ubiquity of service which has enabled "Over The Top" service providers to flourish.

Indeed, there are companies out there already bringing together different access networks to ensure the delivery of mission-critical services. This has not reached the mass market yet, but the fact is that this kind of service can happen today.

(For those interested, TelcoForge recently hosted a conversation with a company doing this called Dejero as part of our Forging Ahead day; the video is available at www.telcoforge.com/forging-ahead-summer-innovation-day").

That might stand the "servco" side in good stead. However, does that spell the death knell for competition – and therefore innovation - on the infrastructure side?

"What you have to do is to figure out how to keep everything somehow competitive up and down the network hierarchy."

Image by Jeshoots on Pixabay

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INFRASTRUCTURE COMPETITION MODELS

The value proposition within telecoms today tends to focus on services layered above infrastructure. That has tied executives to maintaining a market hold over their physical networks.

"Over the years we've seen operators do everything they can to prevent municipal networks."

However, in an environment where we think of the infrastructure side as being the more responsive to government demands for build-out of coverage, partnering with municipal, regional and national government makes a great deal more sense economically – as does partnering with other infrastructure companies. We have seen elements of this in rural areas with Finland's 4GIS, or more recently with the UK's shared deployments of rural 5G and even Malaysia's shared 5G network initiative.

It's not only effective for mobile networks, either. In the case of some Scandinavian countries, working with utilities over the long term has proved effective at reducing fibre deployment challenges.

"Today they have a fairly extensive broadband network out in the rural areas simply because they realised that, once you put a pipe in, you're good - and to be honest, it's not even fibre. You just need to put a duct in the ground and you can pull more fibre through later."

(Coincidentally, this is a similar policy to urban fibre pioneer COLT).

Image by Martin Brechtl on Unsplash

In an environment where infrastructure provides the wholesale environment for services, the economics become quite different. Every wholesale provider benefits from network effects across the entire system, while no individual player needs be confronted by national coverage obligations.

This is all very well, but it tends towards monopolies within any given area. Need that be the case, however? Only if we're thinking of service delivery over fibre.

"There's no viable alternative to fibre deployment. At least, there wasn't. Now, one could argue that fixed wireless, although it sucks, is potentially a viable deployment alternative for fibre; and I would say LEO satellites. Although they have very serious localised capacity problems, certainly for rural areas they would be the most logical way to get that network built eventually."

Another executive agreed.

"One could argue that SpaceX has done that. They've got all these deals with Internet service companies, and they've added the value of intelligence to what is fundamentally a low Earth orbit broadband access network. That's potentially a viable alternative to all the other stacks that those customers might otherwise try to use."

As a result, some kind of structural separation may be feasible which maintains competition both at service and infrastructure levels.

"So I think that there are ways to re-architect the entire network that provides competitive end-to-end services that really benefit the public, if we have the will to do that and are willing to take the several years of disruption that would likely result during the transition to that model."

Image by NASA Hubble space telescope

INFRASTRUCTURE INNOVATION MODELS

There are, in fact, good reasons to drive towards innovation in infrastructure in ways which a vertically integrated market might not be able to support. One of those reasons is to deliver exactly the kinds of services that get talked about on conference stages.

"You think of enabling new use cases, of moving from digital representations to physical elements that can perform tasks, such as robotic platforms or connected vehicles, this is not happening at scale. Why is it not happening? I think one of the reasons is that the network performance is not there."

"I published the network requirements 10 years ago, which are still valid. Have we had any progress? Absolutely not. No progress. The main issue is also around the connectivity. There is no reliable service. We still don't have universal coverage; latency still around 50 milliseconds; so there's no business case for robotic platforms."

Of course, universal coverage is not something which any individual service provider can deliver today in a financially sound way. However, in total across the mobile, Wi-Fi and satellite providers we may be getting close in some countries, and certainly a good deal closer than by relying on any one provider.

Why do services need universal coverage? Some don't. However, for mission-critical services we need to be sure the signal won't cut out. Whether that's cars relying on V2X signals to coordinate traffic on a busy road crossing, 'guide dog' robots using edge GPUs to process visual information, or command-and-control systems for national defence, there are some types of system which just need to work reliably or else they are simply liabilities. Within factories, failing to connect a sensor reliably could result in unnecessary emergency shutdowns costing millions... or failing to shut down in good time with catastrophic consequences.

As you can see, there is a circular logic in play. Without guaranteed performance, there's no business case for advanced applications; without demand for advanced applications, there's insufficient justification for infrastructure investment.

However, the reliability of basic connectivity remains problematic even in premium markets:

"I'm paying broadband - fixed broadband, 100 megabits per second - and my video feed is cutting out. It's not working. Think of how in Australia I'm sitting in one of the most expensive areas in the world. I still don't have reliable broadband."

The emergence of artificial intelligence applications creates new infrastructure requirements that challenge existing network architectures:

"You have a VLM - a Visual Language Model - which you will need to run at the edge, so that means your infrastructure should be designed slightly differently. We need to meet the performance requirements that other consumers of connectivity require, like latency, reliability, speed. And because we do not compress video, you will need to deliver improvements in those connectivity metrics so that robots can process what they see at the edge."

Can this not be processed within the device or robot itself? Not cost-effectively for a mass-market. The price of GPUs would increase the cost of many consumer items to unaffordable levels. As a result, connectivity becomes intimately tied into a new generation of consumer services.

"Speed and coverage on any individual network is becoming less and less important, but it's more about resiliency and efficiency to be able to run the applications over a network rather than the individual network itself."
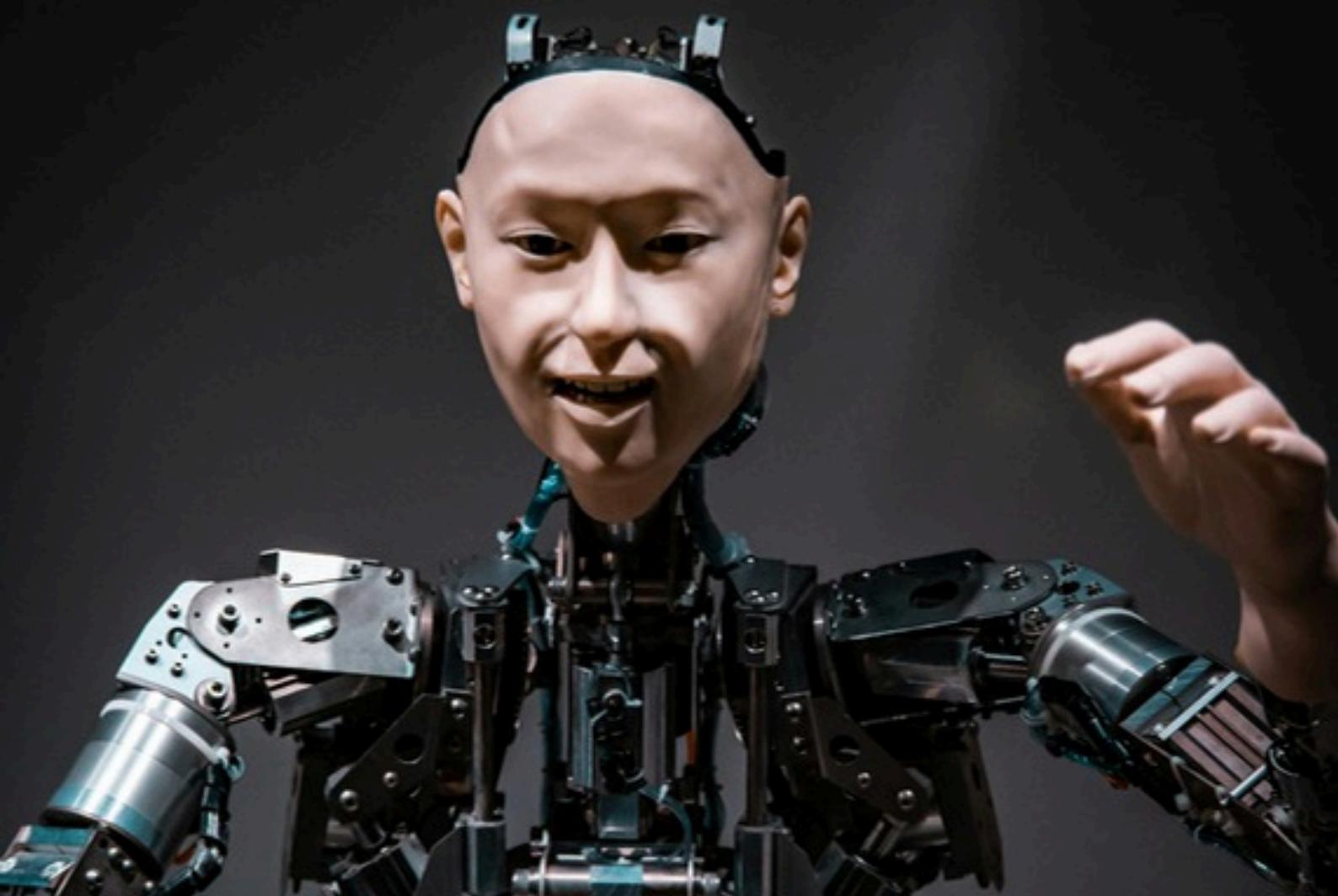
Photo by maximalfocus on Unsplash

NEW VALUE

So far we've established that there might be reasons to separate out infrastructure from services, but what would drive future infracos to coordinate and innovate to deliver the kind of improvements that would be needed at scale?

Without a clear business case and demand already in place, the circular logic outlined above still applies.

However, this is where government involvement to produce the desired outcomes might be necessary. There is clearly a value to an aging society in, for example, delivering the kinds of automated capabilities that can support people living in their own homes safely, or that can help them travel safely thanks to automated transport.

Where current commercial models fail, we might see new forms of collaboration with the state taking place to strengthen infrastructure, either with state-supported enterprises or with new forms of collaboration. And there is a tool on the horizon that may be able to help negotiate that collaboration.

Within the 6G community today, and particularly at Europe's SNS-JU, there is work ongoing to <u>define "Key Value Indicators"</u>, new metrics used in parallel with KPIs.

While KPIs tell us about technical performance, KVIs would provide metrics on the societal and environmental benefits of choices for e.g. network rollout, upgrades or technology options.

Many people have shied away from talking about KVIs because technology is a more familiar conversation, but these might be the unsung hero of the development of 6G. While developing KVIs is a huge lift and fundamentally unfamiliar territory for the industry, they could effectively be used to mediate between the pressure for a business case and the pressure to support society.

For example, being able to project the impact of an infrastructure upgrade or extension on local economic and health outcomes translates directly into improvements in tax take and reductions in costs. That creates incentives for forms of co-investment with government agencies, local groups or other players.

NAVIGATING CORPORATE CHANGE

As we can see from the pages above, there is a huge amount of potential work that can, or perhaps needs, to be done to address key challenges within the telecoms industry and its supporting structures. Participants put their fingers on one critical element, however:

"The incentive structure, and I think the organisational structure, has to be set up differently to be able to actually turn invention into innovation [in technology or business strategy]."

"You have to *decide* to be innovative. You have to *decide* to make the cultural shift in your company. And then you have to follow through with reward structures that emphasise the culture that you want in the end game, not the culture that you have now."

That change management, more challengingly, needs to apply to how executives and managers are rewarded in order to incentivise long-term approaches.

"The reward structure of the people who control the money is key... Anybody who's risk averse or worried about the next quarter revenue, or worried about what my share owners will think, or worried about the fact that if I overrun my budget by $100,000 I'm not going to get my bonus - all of that stuff has got to go."

This creates practical challenges:

"That's not easy because, for example, the sales team might find that their incentives to sell what they have right now might evaporate. That's going to irritate your sales team. They can't buy their eight-metre boats in those circumstances. So what are we going to do about that? It requires a cultural shift in the company."

However, one executive proposed a specific mechanism for change:

"You could have a decreasing exponential schedule about the total rewards that go to R&D staff, sales staff, marketing staff and so on, where every year the contribution of the old stuff goes down by a factor of 2 and the contribution by the future stuff goes up by a factor of 2. Sooner or later this will all self-regulate into a way that changes the culture of risk-aversion, selling what we've got and worrying about the next quarter, to a culture of planning for the future, and incentivising risk taking, and building prototypes that don't get stuck in prototype purgatory but actually have a motivation to drive into volume deployment."

Summary: Risks & Routes Forward

Workforce

Risks	Options
Key skills age out of the workforce. Increasing dependency on vendors & consultants. Lack of industrial memory increases failure risks. Young people lack starting roles.	Refocus technology stack towards more generic software. Encourage recruitment from non-traditional sources. Actively in-source skills & knowledge. Create strong internal knowledge transfer systems.

Regulation

Risks	Options
Unfit regulation for current & future telco models. Lack of knowledge within regulators. Cognitive capture from operators. Regulatory 'disharmony' prevents scaling.	Encourage simpler international coordination on regulation. Work with regulators on 'telecoms' definition and scope in light of market changes. Collaborate on training regulators' staff on key issues and technologies.

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Intellectual Property

Risks	Options
SMEs are choked out by litigation risk. Uncertainty over FRAND terms undercuts the ability of inventors to commercialise.	Create clarity into who holds what intellectual property for easy reference. Simplify and clarify rules over FRAND terminology and usage. Create and adopt new norms for handling IP disputes outside court in the first instance: for example, an international arbitration body.

Policy & Government

Risks	Options
Government policy treats telecoms players both as a foundational national good and as commercial entities, with often inconsistent results. National governments can develop poorly-informed policies that undermine the industry's health. Levels of public investment vary widely, but unclarity or instability in how funding may be used can strongly limit the effective execution of even high levels of investment. Threats of replacement from outside traditional industry boundaries can stimulate telco activity on particular areas but needs judicious application.	Disaggregate the critical national infrastructure from the commercial service elements to create clarity of interactions with government. Focus government investments on stable long-term national programmes to create certainty and impact. Create capacity-building programmes for policymakers as well as regulators. Hedge against replacement or 'game theory' practices from hyperscalers, for example by refocusing commercial dependencies away from infrastructure.

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Business Model Innovation

Risks	Options
Commodification of the core telco business offering. "Telcos" conceiving of themselves as vertically integrated rather than horizontal platforms with different investment and innovation cycles. "Operators as a whole still haven't figured out what their longer-term strategy is and why they add value to the world"	Build monetisation less on connectivity and more on derivative revenue, APIs being a nascent example. Break out 'the telco' into horizontal business units with their own P&L, for example in real estate, applications, etc and enable them to innovate and compete in these areas. Lean into consumer concerns over fraud, false identities etc and act as the consumer champion in building online trust leveraging unique telecoms elements.

Market Structure

Risks	Options
Replacement or partial replacement by hyperscalers. Utility 'dumb pipe' model reduces incentives to innovate on infrastructure. It also risks creating local infrastructure monopolies and dangerous dependencies for servcos. There is little business case for individual telcos to invest at national scale to support hypothetical next-gen services like robotics. Organisational structures do not incentivise long-term innovation.	Embrace the ability to run services over other players' infrastructure. Encourage fibre alternatives as a means to reduce or eliminate local infrastructure monopolies. Embrace public-private collaboration on network upgrades to enable next-gen services. Support the development of Key Value Indicators to encourage collaboration and investment from public and third-party sources. Adapt the incentive structures to allow for corporate change and innovation, starting with executives and working down.

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CONCLUSIONS

There is a fundamental tension at the heart of the telecoms industry which has left it unable to easily respond to the rapid changes born of our own ability to deliver data services at high speed. Most telcos have been unable to capitalise on the app economy, the internet boom and now AI innovation because they are treated as a mission-critical public good as well as a commercial entity.

There are ways to address this, for example by learning from other industries such as energy, where generation, distribution and services are operated separately.

While this report discusses arguments for a horizontal separation between service and infrastructure as a means to solve this crisis of identity and regulation, it is far from the only one.

However, by being both a commercial entity and a necessary element of modern states, telcos today are struggling to do either well.

Ultimately telecoms executives and policymakers in different countries will have to answer a fundamental question between them:

What do telcos want to be when they grow up?

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The TelcoForge team would like to thank the senior executives for their time and insights making this report possible.

We look forward to many other constructive insights.

Leaders' Meetings take place monthly on an invitation-only basis. Executives on the invitation list have no obligation to attend but may propose an alternate participant if they are unable to join.

Please contact TelcoForge below if you would like to:
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