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It's time to embrace openness and collaboration:

Santiago Madruga, Head of EMEA Telco & ICT, Red Hat

REDHAT SPECIAL PROMOTION

SPECIAL REPORT: INTERNET OF THINGS

Featuring exclusive survey results, Telefónica's Chief IoT Officer, business models and security

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Unify

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IoT hype recedes, but progress is being made

Our latest special report delves into the Internet of Things – you may have heard of this emerging market opportunity for telcos. I make such a facetious comment deliberately because the hype about it has not been backed up by what has actually happened. When we last polled the industry 18 months ago, we asked this very question: does the IoT hype reflect the reality? In 2015, 77 percent said yes, while only 56 percent said it was the case this year. You can make your own mind up by reading the survey results in full. The views of Vicente Muñoz, Telefónica's Chief IoT Officer, will also inform. He tells us enterprise customers now see the IoT as a must, rather than as "a trend, a hypothesis, an option".

We have interviews with two other c-suite execs in this issue. Elisabetta Castiglioni is the CEO of Telekom Austria's new A1 digital division, which plans to offer cloud and IoT services to enterprises across its footprint. "We see a role for us as a regional player as opposed to a hyperscale, global player because we're very entrenched in our territories and have existing customer relationships," she says.

Meanwhile, in Bulgaria, Vivacom CEO Atanas Dobrev has big plans. "We are up there with the likes of South Korea," he says, talking up the operator's broadband offering. He has his eyes on bigger targets; the company intends to launch an MVNO and get into the smart cities space. "Only those that adapt to this changing climate – to these trends for digitalisation and automation – will survive," he warns.

This issue also sees the launch of a new infographic feature – Data Point. This will zoom in on various markets in Europe and highlight key performance metrics from telcos; anything from mobile and broadband subscriber numbers to NPS scores and IoT connections. We begin in the UK, assessing how key metrics have progressed in the past 12 months in one of Europe's most competitive markets.

Finally, our back page feature highlights something that telcos rarely admit to – sending senior staff back to school. Deutsche Telekom has teamed up with America's Duke Corporate Education business school to improve the digital skills of its managers. Necessary and worrying in equal measure.

Enjoy the issue.

Marc Smith, Editor

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Slim-line Ericsson could shed media business as CEO flaunts new strategy
Ericsson is exploring strategic options for its media and IT cloud infrastructure hardware businesses as part of a new strategy unveiled by CEO Börje Ekholm.

Vodafone uses customer data to launch Smart Pricing alerts
Vodafone has introduced a service that uses customer information to create personalised and timely offers.

BT, Deutsche Telekom team up to offer network services to enterprise market
BT and Deutsche Telekom have sealed a partnership to offer a range of global network services to business customers.

Virgin Media suspends four employees after Project Lightning miscalculation
Virgin Media has suspended four employees as it grapples with the fallout from misreporting its Project Lightning broadband rollout.

Vodafone UK debuts AI chatbot, abolishes roaming in customer service push
Vodafone hopes a chatbot called TOBi and the lure of free roaming in 40 countries around the world will help it get back on track in the UK.

Majority of UK mobile contracts to be SIM-only by 2021, analysts predict
Over half of mobile contracts in the UK will be SIM-only by 2021, according to new research.

Telekom Austria makes first investment in startup from its own incubator
Telekom Austria has made its first investment in a company fostered by its start-up program.

BT turns to students to rewrite customer service rules for UK businesses
BT has opened a new Customer Experience Lab and is working with a business school to develop new concepts that will help it to "reinvent" the traditional contact centre.

Ericsson hits new low on operating loss, "unacceptable" performance at IT, cloud arm
Ericsson CEO Börje Ekholm described the vendor's latest financial performance as "unsatisfactory" as it saw sales and profits tumble.

Nokia's mobile networks chief leaves in surprise move
Nokia has rejigged its senior leadership after Samih Elhage surprisingly quit the Finland-based vendor.

Opinion

Telcos must walk the digital transformation walk
By Santiago Madruga, Head of EMEA Telco & ICT at Red Hat

Q&A

Telefónica Chief Data Officer Chema Alonso
Chema Alonso discusses Aura, a digital assistant that uses cognitive intelligence it has developed with Microsoft, that Telefónica unveiled at Mobile World Congress

Analysis

Cisco, Ericsson admit to ongoing issues but remain committed to partnership
Ericsson's new CEO is "drinking through a firehose", while Cisco's CEO admitted employees are working "round the clock" to make the two vendors' nascent partnership a success, discussions at Mobile World Congress have revealed.

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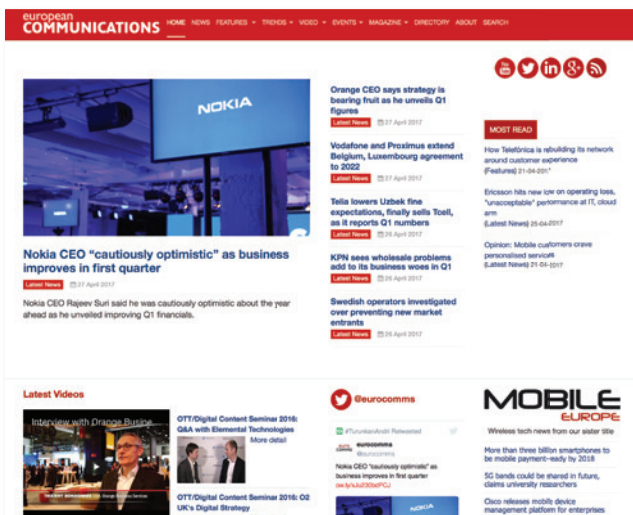
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European Communications

Data point:
UK telecoms market

In a new regular feature, we assess key data points relating to the European telecoms market. Statistics from the UK show how Three has knocked mobile rivals for six, while BT remains the dominant broadband provider and Sky leads in TV

Mobile: **3.04 million** (+20,000)

Broadband: **4.9 million** (+200,000)

TV: **3.7 million** (n/c)

Broadband: **6 million**

TV: **11.4 million**

*Sky figures are for the UK and Ireland. They did not break out broadband and TV figures for 31 December 2015.

Mobile: **30.2 million** (-377,000)

Broadband: **10.1 million** (+250,000)

TV: **1.74 million** (+338,000)
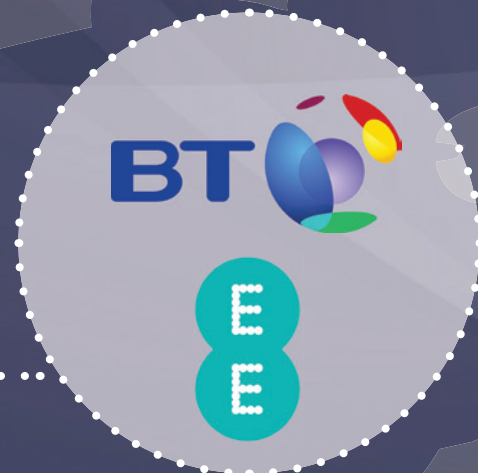
TalkTalk

Mobile: **793,000** (+197,000)

Broadband: **3.96 million** (-131,000)

TV: **1.33 million** (-106,000)

O₂

Mobile: **25.5 million** (+444,000)

3

Mobile: **11.4 million** (+609,000)

vodafone

Mobile: **17.9 million** (-495,000)

Broadband: **183,000** (+89,000)

Figures correct as of 31 December 2016. Year-on-year increase/decrease shown in brackets. N/c equals no change.

Telco transformation: Culture at the core

Telcos' digital transformation will require a cultural shift as well as a technological one, writes Santiago Madruga, Head of EMEA Telco & ICT, Red Hat (pictured). This is already beginning, and can in many ways be described as an opening up. Opening up internal structure; opening up the mentality towards new engineering approaches; and being more open to collaborating in the changing telco ecosystem.

Organisationally there is a need to break down silos between the network and the IT sides of the telco business. Traditionally telco organisations have had clear separation between the CIO and the CTO, but as they look to virtualization, cloud and software-defined approaches, this boundary is no longer as clear. If telcos are to make use of this new wave of technologies to bring services to end users faster, the IT world and the network world need to work more closely together, and open up to enable the flow of information between different parts of the business.

We're already seeing organisational change being put in motion. Carriers have traditionally been risk averse, and for good reason – with a monolithic structure it has been harder for them to move quickly. But we are seeing some of the larger CSPs creating a new role of chief digital officer and starting to bring together the CIO and CTO functions, enabling sharing of best practice across the business.

On the engineering side, DevOps can help decrease manual intervention and up automation. DevOps can be seen as a cultural mindset that flows through software development and the deployment life cycle. The DevOps mindset accommodates the continuous and rapid evolution of the features and capabilities. At the moment, telcos can take months to spin up new services, yet consumers are looking to access them in hours or even minutes. DevOps can catalyse a new, agile style of thinking.

The movement towards a software-defined, virtualised architecture is changing the economics and dynamics of the industry, redrawing the lines of competition and throwing traditional relationships up in the air. Whereas previously operators relied on integrating vertical solutions delivered by established network equipment providers, NFV breaks down this approach by decoupling hardware from software, opening the way for new players to enter the market. Add open source into the mix – towards which many operators are looking for its promise of increased time to innovation – and operators are unlocked from proprietary tech, meaning they are free to choose the vendor that most closely delivers against their needs at any time.

Open source is not just a technology; it is a culture, a way of working. Communities of developers from different organisations collaborate towards a common goal, sharing ideas to find fresh ways of solving challenges. While carriers have typically not enjoyed huge R&D budgets, now they can use open source communities, such as OpenStack, to bolster their innovation by gaining access to developers in the software-defined world. They can tap into these existing communities of innovation for technologies and best practices.

Pure-play digital companies that are disrupting the telco market have already been using open source to help increase competitiveness and accelerate modernisation. Now, telcos have the opportunity to do the same, and we can see their investment in open source across areas including the IoT, 5G, SDN and video delivery. A cultural rethink comes as part of this, as telcos look to create the conditions internally to take advantage of the open source methodology.

For the best chance of success, digitalisation will be powered by an ecosystem of technologies and partners collaborating to offer better interoperability, performance and functionality. If telcos can embrace this mindset of openness and collaboration, together the industry can build the next generation of networks and standards to deliver maximum value to telcos, businesses and the users we serve.

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The C-Suite

Interviews with senior execs from Europe's top operators

A1 digital CEO: Our ambition is to be the region's pre-eminent cloud, IoT provider

Elisabetta Castiglioni tells Marc Smith how Telekom Austria's new digital arm, which launched on Valentine's Day, plans to win the hearts of businesses across Europe

Elisabetta Castiglioni

As goals go, Elisabetta Castiglioni's are lofty. "Our ambition is to be the pre-eminent cloud and Internet of Things provider in our region," she says without hesitation when asked what the ultimate aim is for A1 digital, Telekom Austria's new business unit, of which she is Chief Executive.

Castiglioni, who has sat on the op-erator's supervisory board since 2012, was part of the cabal of executives who cooked up the plan to create the new division, which promises to provide cloud and IoT services to enterprises. The former CEO of Siemens' Global Media Business says she decided to move from Telekom Austria's boardroom to the op-erational floor because the new business has "all the ingredients to be successful".

A1 digital has taken ownership of Tele-kom Austria's existing M2M business unit and is adding a range of cloud services – Office 365, website design, storage, vir-tual servers, and security and payments, to date – as it looks to target enterprises across its geographical footprint.

Castiglioni explains: "As a company we recognised cloud and the IoT is [where we need to focus] in B2B." Announcing the launch in February, Telekom Austria Group CEO Alejandro Plater described A1 digital as "a paradigm shift away from our traditional core business toward digitalisation". More concretely, the op-erator thinks it can gain a slice of what it cites as a €15 billion opportunity from three million small and medium-sized enterprises across central and eastern Europe, including Germany, over the next few years.

"Cloud maturity within our target customer group is evolving," says Castiglioni. "There is more willingness to put workloads in the cloud. I see cloud as the foundation, the prerequisite for the IoT." When it comes to the IoT, A1 digital is offering managed connectivity alongside dedicated asset tracking, fleet management and smart metering services. It also promises to help com-panies to develop connected products through workshops, design capabilities and business model generation. "We've been working on M2M for the last five to six years," says Castiglioni. "We want to take those activities to the next level [by] adding further services... and sharpening the focus."

Focus and dedication

A1 digital has 60 employees – a com-bination of existing resources and new hires, according to Castiglioni – and will be based out of Vienna. "This is another

demonstration of the commitment of our owner América Móvil to Vienna as our headquarters and as a business location," noted Plater at the launch. Castiglioni says the decision to create an entirely new business is born out a need for "focus and dedication". She adds: "It's also about speed, time-to-market... and scalability." She sidesteps a question about whether this means how Telekom Austria has been selling to companies previously was flawed, but says: "What we want to do is take decisions quickly and implement them quickly."

Castiglioni describes A1 digital as "the product house" that works "in close cooperation" with Telekom Austria's local companies to deliver the solutions to customers. A localised focus is key to the company's go-to-market approach. "We're a regional player, a European company not an American one," Castiglioni says. "We see a role for us as a regional player as opposed to a hyperscale, global player because we're very entrenched in our territories and have existing customer relationships." Citing a Gartner study, which found that 60-70 percent of cloud services are sourced through regional providers, she adds: "This is a key asset."

But the CEO struggles when asked to name A1 digital's USP – clearly it is not the only digital provider game in town. Looking to contrast the company with more global players again, she says the fact that data is hosted locally is a key asset. Important to some companies, undoubtedly, but not exactly something that will create a buzz in the market. Telekom Austria disagrees, claiming Austrian and German companies are "very sensitive" about data security. It has invested €30 million in new data centre capacities to back up its beliefs.

Castiglioni points out that it is still early days. "This is a market that needs to be created," she says. "What is important is to help customers on their journey, coaching them sometimes."

Logical next steps

Austria will be the first and obvious market that A1 digital is targeting. "We are very well positioned [in our home market]," says Castiglioni. Telekom Austria also has operations in Belarus, Bulgaria, Croatia, Liechtenstein, Macedonia, Serbia and Slovenia, and these are next on the list. But the operator has bigger targets in mind, too. It plans to set up a separate company in Munich to attack the German

> **Cloud maturity within our target customer group is evolving**

enterprise market. "It's a big economy, so it's the logical next step," she says. Exact timelines of when this will launch are still being worked out. What about other German-speaking markets, such as Switzerland? "There is nothing concrete that I would mention but the services we provide are international," Castiglioni responds. She dead bats a question on whether A1 digital needs to get involved in M&A to succeed.

Although SMEs are the main focus, the CEO does not rule out trying to tempt larger companies. "I like to say 'no customer is too small, no customer is too big'," Castiglioni says. "Our services are scalable... what is important is to add value." She defines value as operational excellence. Citing the likes of manufacturing and logistics companies,

Castiglioni explains: "If you ask them if they want to have their assets utilised in a better way the answer is always 'yes'."

Specifically, Telekom Austria wants to replicate deals like the one its M2M division signed with construction group PORR last year. This saw it provide asset-tracking services for the company's vehicles at 30 locations in Austria, Germany and the Czech Republic. The operator worked with telematics specialist CEplus on the project, financial details of which were not disclosed.

Castiglioni won't share what revenue targets A1 digital is hoping to achieve. Telekom Austria doesn't appear to have high hopes in the short term, bundling the new business into the Corporate, Other & Eliminations section of its financial reports. A quirk of accounting means this section registered revenues of minus €10.3 million in the first three months of 2017. There is also the suspicion that A1 digital could amount to little more than a rebranding job of existing assets.

Nevertheless, there is something to like about the approach Castiglioni and her team are taking. It is focused when it comes to services, in contrast to other, bigger rivals who appear to believe they can be all things to all people. Germany apart, where it could struggle to make an impression, its local focus is logical but should also be a source of strength.

Importantly, the CEO claims the new company is not suffering when it comes to hiring the right talent. "We have exciting projects," she says. Putting new hires "at the centre of decision-making... makes all the difference," she believes, particularly when comparing A1 digital to more established digital providers. Launching eight months after Telekom Austria announced plans for the division, Castiglioni says her biggest competitor is time. "All the rest is execution," she concludes. 🔲

Vivacom CEO: Big ideas set to follow focus on the basics

With fresh ownership, a new 4G network, an aggressive fibre campaign and a popular IPTV proposition, the Bulgarian number one has big plans. Its Chief Executive Atanas Dobrev tells all to James Blackman

Vivacom, the operating brand for Bulgarian incumbent BTC, is under new ownership at last, and looking good for it. In August, the Bulgarian competition authority finally approved its sale to local businessman Spas Roussev, who acquired a 46 percent controlling stake for €330 million.

The sale established a consortium of other minority investors based variously in Bulgaria, the UK and the US. Importantly, it ended a period of uncertainty, after its largest shareholder had defaulted on a loan following the collapse of Bulgaria's fourth largest lender, Corporate Commercial Bank, another of his business interests.

Atanas Dobrev, the company's Chief Executive, says the company has clearer direction now, in terms of its parentage, but that its 2016 performance was rock solid anyway, and its strategy has been designed and executed without distraction.

Total revenue across its full stack of communications services was up by 3.2 percent in the period, to BGN 875.3 million (€447.5 million), spurred by increased sales in mobile and pay-TV. EBITDA was down, by 6.4 percent, to €158.8 million, but that is an inevitable flipside of spiralling demand for smartphones, observes Dobrev.

Smartphone penetration in Bulgaria is close to 60 percent, below the EU average of 65 percent. Leading European markets are just rising above 80 percent. "The market is small, but competitive [and] exciting," remarks Dobrev. Bulgaria has among the lowest per-capita GDPs of any country in Europe, but strives at the same time to match much better remunerated markets in terms of quality of service.

"We are looking to deliver quality communications services that are on par, or even above the EU average," he says. "Bulgaria is one of the top three countries in the world for broadband speeds – we have higher average broadband speed than any EU country." He adds: "We are up there with the likes of South Korea."

The issue is with coverage, in rural areas particularly. As its sale has unfolded in the background, Vivacom has been busy remedying that, with the rollout of both broadband and mobile infrastructure. Indeed, just last year, it constructed an entire 4G LTE network from scratch.

Tardiness and speed

As it stands, Vivacom is the third largest mobile operator in Bulgaria, with a 27 percent share of the total subscriber market. At last count, it had 3.1 million customers, up by 3.6 percent in 2016, with the highest proportion (87 percent) of any operator on post-paid contracts, and also of corporate customers.

> **"** Bulgaria is one of the top three countries in the world for broadband speeds **"**

It holds the same position for mobile revenue share, with 28 percent of the Bulgarian total. Rising smartphone sales have bolstered its position, even if higher device costs, along with pressure on the corporate sector, have offset its margins.

Vivacom has arrived at the global 4G fest somewhat late, but with notable intent and great cheer. More than a fifth of its total revenue went back into the business last year. Much of that spree went on a brand new LTE network, which was record breaking in terms of the pace of its rollout, going from zero to 87 percent population coverage in just seven months.

It has opened a gap of at least 10 percent to rivals Mobiltel and Telenor, from a standing start in May. It ranks as above-average in Europe for coverage, and "bang-on" for speed, says Dobrev. "We have done in just seven months what might have taken a year and a half, or two years at a more normal pace," he remarks.

Dobrev is quick to praise the work of his Chief Technology Officer, Radoslav Zlatkov, in the company's network face-lift. The tender, towards the end of 2015, was run as a "reverse Dutch auction", with the three vendors – Ericsson, Huawei, and Nokia – starting the bidding with their lowest selling prices. It is a process that originated in the Dutch flower markets with speed in mind, to ensure perishable items remain saleable after the event. Huawei, which built Vivacom's 3G network, offered the lowest purchase price.

Customers have been able to use 4G from the get-go, without needing to upgrade to pricey 4G tariffs. SIMs have been swapped free of charge, and Vivacom has handed 4GB of data to all and sundry, to convince them of the new network wizardry.

Vivacom will start making inroads into the country's 4G hinterlands, but says Dobrev: "You know how it is with mobile – the higher you go, the harder it becomes. The first 20 percent is easy; the last two percent is hell."

On the fixed side, Vivacom has a leading share in broadband – 26 percent of the total subscriber market – and plenty of room to manoeuvre. It is

Atanas Dobrev

swapping out about 100,000 kilometres of copper lines for fibre optic cable at a decent clip, and with an impressive return. Its fixed broadband subscriber base jumped 12 percent to 437,000 in 2016, spurred by customers switching to fibre-optic connections.

Around 230,000 customers are now taking fibre services – more than a half of its total base, and a fifth of its current network reach. It has passed 1.1 million homes with FTTH, or around 40 percent of the Bulgarian market, of 2.8 million households.

Dobrev suggests as much as 60

percent of customers have access to "some sort of fibre", and unimaginable choice. "We still have about 800 broadband operators in Bulgaria – a country of seven million people. So when we say it is competitive, we're not joking," he remarks. In reality, many are smaller neighbourhood operations that have slung across aerial cables, and are "not fully following the procedures".

Most city dwellers can choose from five or six suppliers, including the major brands. Regulation of the market has improved, the CEO adds.

Vivacom has its sights on passing an-

other 250,000 households in the near term, and around 100,000 this year. He won't speculate on connection targets, he says, except the company expects a similar performance to last year, and will also introduce VDSL to feed smaller cities and rural areas.

"The request, to permit us to launch this technology, went in to the regulator about an hour ago, so fingers crossed," he says.

Pay-TV balancing act
The rise of fibre broadband has of course shifted the dynamic in the pay-TV

market, which enjoys around 90 percent penetration in Bulgaria.

Vivacom straddles the divide, between satellite-based provision and IP streaming. It is a juggling act that has worked so far; the company's pay-TV base increased by 11 percent, to 410,000, last year – fixing it at number three in the market overall, and number one and two, respectively, in the IP and satellite TV markets, within it.

It's a very decent run for a business function that was originally conceived, 10 years ago, from a defensive position. "The biggest threat was from the cable networks," says Dobrev. "Because they could offer a service we couldn't – which is entertainment. That's why we started initially with satellite TV services."

The rise of broadband as an alternative transmission technology has shifted Vivacom's focus away from satellite TV. "There's only so much you can do with it," says Dobrev. "Yes, you can provide great coverage, but you are limited by the cost of capacity, especially in a small market, because the cost can only be spread over a limited number of subscribers."

Even so, Vivacom felt compelled to return two years ago for local satellite services provider NURTS (National Unit Radio and TV Systems), which it sold in 2011. "It was an opportunistic acquisition. We disposed of it to focus on mobile, but it was on the market at a good price," says Dobrev.

NURTS covers three disciplines: TV and radio broadcasting, tower management, and satellite uplink services. "To get into the tower business, just as we were rolling out 4G, made sense," adds Dobrev, who says, also, the broadcast piece is being "down-sized or right-sized", and the satellite uplink business is complementary anyway.

However, it is the immediacy and availability of IPTV, via 4G as well, that Vivacom is betting on.

"That's the thing about this industry – it changes expectations, and, in the end, it changes lives. IPTV is a great example, as is mobile broadband – just think, in seven or eight years, we've gone from KBps to MBps, and from being able to service just a couple of subscribers in the cell, to servicing everyone."

Indeed, gigabit-per-second mobile speeds are now in sight. The parallel lines of service provision are converging around wireless broadband. Dobrev says Vivacom laid plans to become an "integrated operator" at least eight years ago – when it still had the disjointed look of a "classic incumbent", and he had just joined as Chief Financial Officer.

"The plan was all about convenience. Technology is standardised; it is 'off the shelf'. Yes, you can play with it. But so long as you're not stupid, you can do it – if you're reasonably smart, it's not that difficult. The hardest thing is to keep customers, and serve them well," he explains.

"The customer doesn't care about the tech; they just want good performance – adequate speeds, dependable coverage, decent terminals, great service. It's about what customers want and need, and what you can offer to capture more of the household."

Moving into MVNOs, smart cities

That approach still informs Vivacom's strategy. It wants to use its own digital transformation, plus the industry's plummeting wholesale rates, to expand into new European markets, specifically with an MVNO offering flat-rate calls anywhere in Europe, which will "compete with the likes of Lyca and giffgaff".

"There is an opportunity to offer the same service at the same price in all European markets, which is not being fully explored," says Dobrev. Automation will reduce the cost of service provision, and make such forays viable even for operators with comparatively lower ARPU.

"Whatever can be automated will be automated – that's the next frontier, and it's coming fast," he says.

> **" Automation and a low cost base will enable us to enter other markets "**

In telecoms, any functions that do not require a "personal touch" will be managed by machines, covering most offline activities currently being handled by staff both front of house and in the back office. "The combination of automation and a low cost base will enable us to enter other markets," he explains.

Moreover, Vivacom is betting on the smart city scene. It has established a new department, called Special Projects, M2M Solutions and Innovations, which is focused on connecting up municipal and public transport services.

Dobrev reels off its subjects of special interest: smart parking, smart lighting, air monitoring, weather forecasting, security. He zooms out, and signs off on a Darwinian note, about survival of the fittest. "In 10 years, the landscape will be different," he says.

"Only those that adapt to this changing climate – to these trends for digitalisation and automation – will survive. No one will remember the rest. But, again, it isn't about the technology. The seeds are already there. It is how you plant and nurture them, and how you harvest them ultimately."

Telcos must find the right value proposition to succeed in consumer IoT

Yuval Mayron, General Manager, Internet of Things, Amdocs Technology, discusses what the telecoms industry needs to focus on if it is to succeed in the consumer IoT space

European Communications: With so many connected devices out there, from cars to child tracking devices to the connected home, how do you see the consumer IoT world evolving?
Yuval Mayron: There's a lot of hype today around the IoT. It's a trend driving a lot of money and a great deal of innovation. The industry will have to work hard to create real traction around its value, experience and monetization in order to drive vast adoption. However, the main industry challenge is not around the technology but rather around consumers and their behaviour. People want things to work intuitively without the need to "think" too much. The "Why" is a key question for the success of this evolving trend. The big technology companies are trying to build all kinds of frameworks and environments for the small "startup" companies that will bring the "ideas" for the consumer world. There's no one single formula that can lead to the "killer IoT app", but it's the need for collaboration which is clear to everyone. The IoT is too big to allow one player to dominate it, like the way things are currently with the internet of "people".

An additional trend is the business shift of device manufacturers in their monetization model from selling just hardware to selling premium services. This potential shift is hard for OEMs that are still struggling with the development of devices and services. Becoming a global service provider requires different expertise, practices and a huge investment. There's no doubt that OEMs will look to partner with telecommunication service providers (CSPs): the OEM brings the hardware together with innovative domain expertise and the CSP has expertise in selling value added services.

We at Amdocs have been enabling innovative consumer experiences for more than 35 years. In fact, it drives everything we do and we believe there's a huge opportunity in consumer IoT. We regularly meet with CSPs, OEMs of all sizes and industry leaders and it's clear to us that this domain, along with other domains shaping consumers' digital lifestyle, will grow significantly over the next few years. All you need to do is look around and you'll see that it's already changing the way consumers live their daily lives.

What, in your view, is the key challenge in the consumer IoT market?
I think that the fundamental challenge is focused around the value for the consumer. Consumers still don't identify meaningful value in the connected services and we still don't see any killer app out there. From the point of view of the OEMs and CSPs, the value is based on the ability to create the correct monetization model and provide a lot of consumer education.

It's very hard to predict consumer behaviour and taste, so trial and error could be a good method to explore this world. But the problem with trial and error is that you need to try a lot of different things in order to find a single "good" idea and that requires a lot of integration. So OEMs with potentially good ideas really do struggle to invest in lots of integrations and they could use some help. This is exactly the touch point that we at Amdocs are focused on – helping OEMs (of all sizes) on the one hand, while bringing in business to CSPs on the other.

We understand that offering and supporting experimental IoT value added services is extremely complex, to say the least. It requires support capabilities and expertise in the fields of service and device registration, network activation, payment processing, and care and support – all of which OEMs currently know next to nothing about.

At the same time, telecommunications service providers have been offering value added services to consumers for years and they're trying to diversify their business and penetrate new markets. So consumer IoT presents the perfect win-win opportunity for OEMs and service providers to join forces. And the right business model for that

Yuval Mayron, General Manager, Internet of Things, Amdocs Technology

will be using an external, SaaS-based platform for experimenting with new consumer services. Such a platform will enable both sides to integrate once and benefit from the ecosystem of players, without the need to integrate again and again.

What is the added value Amdocs brings to the consumer IoT table?
In this environment where we have so many unknowns and the initial effort for setting up every application is high, we're offering an "integrate once, benefit from many" solution, which provides both the business enablement and partner scouting elements. We enable this partnership and make sure consumers enjoy a real digital experience. In fact, our IoT enablement platform delivers a single unified experience to all market players – OEMs, service providers, technology enablers and consumers.

What other solutions does Amdocs offer in the consumer IoT domain?
In addition to our consumer IoT services platform, Amdocs offerings for consumer IoT span three additional areas: billing for consumer IoT, embedded SIM (eSIM) – remote SIM provisioning – and our connected home offering. Billing for consumer IoT is where we help our traditional service provider customers monetize consumer services such as supporting many devices under a single account with a shared bucket, or complex models for the connected car like enterprise billing for telematics while billing for Wi-Fi in the car against the consumer account, billing on behalf of the OEM, bifurcated billing and lots more related models. The IoT is the first case where service providers are facing the need to support eSIM for secondary devices and Amdocs is there to help solve the many challenges in this fast-growing domain. Our connected home offering is a complete end-to-end vertical offering launched a few years ago and which is currently in use in eight countries around the world.

Could you elaborate about Amdocs' approach to the connected home…
Amdocs understands that home security

is of upmost importance to consumers and this should be the "cornerstone" penetration point for other services around the home like home automation, energy management, video monitoring and multimedia management. The common practice today is that consumers use different solutions from different vendors for each of the services I just mentioned. No doubt that this is a very bad experience for the consumers when all these services can be provided by a single application based on a professional and secure solution provider. This is exactly what we offer.

So while there are many low-end devices out there in the open market, we strongly believe that consumers are looking for a robust, reliable and trusted solution when it comes to security. Our experience shows that consumers are willing to pay the extra few dollars per month to get a service from a trusted vendor rather than rely on a DIY solution because of the combination of high end, reliable and strong devices with high end and reliable services. We are offering an end-to-end, white label solution composed of Amdocs managed cloud and apps and smart security hardware (gateways and devices), provided by a global security leader. Our partner also takes care of the supply chain and professional services for installation, support and alarm monitoring.

Are you also planning to offer this through your telco customers? And if so, why do you think it's a great market opportunity for them?
We talked about the fact that telcos are looking to experiment with consumer IoT and the reality is that for the connected home, we actually already do this. In the next month or two we'll be launching the connected home service with a leading service provider in Europe that combines great innovation with strategic thinking.

We believe that telcos have numerous advantages in being the providers of these solutions as they have a direct and close relationship with consumers. They can support the required telco-grade service, they have the right back-office assets like billing, call centers and support, and they are already offering consumer digital services.

What do you see as the future of these solutions?
Our service provider customers who are already experimenting in consumer IoT are looking for ways to expand their offering to several consumer IoT solutions for the same customer. The hot trend in this domain is building a security package for the family, which encapsulates several solutions such as security for the home, child tracking, elderly monitoring and the connected car. These packages will bring meaningful value to consumers and enable them to enjoy a real seamless and digital experience for the entire family. Of course, some will "survive" because they are more attractive than others and new solutions will replace those which weren't attractive enough.

Finally, what do you enjoy most about working on the emerging consumer IoT space?
When you're dealing with such a complex domain with so many vertical sub-domains and players in the market, it's fascinating to try to figure out how this market will evolve in three, five or even seven years and what the needs of this market will be in the future. I believe in solving real problems of high scale and enjoying the process of identifying, analysing, thinking strategically and innovating new ideas to help this reality come true.
www.amdocs.com

Special report

INTERNET OF THINGS

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Q2 survey: Do believe the IoT hype
(although we're more circumspect than before)

European Communications' latest quarterly survey finds the telecoms industry is less sure about how big an opportunity the IoT can be

Respondents to European Communications' latest quarterly survey overwhelmingly think that the telecoms sector is better positioned to take advantage of the Internet of Things today versus 12 months ago. Almost eight in 10, 78 percent, say this is the case.

According to one respondent: "With the advent of 3GPP standards such as NB-IoT, I feel [the telecoms industry] has taken big steps towards catch-ing up with proprietary standards like LoRA, Sigfox etc."

The survey polled 126 people in March. Thirty six percent of respondents were network operators, while 30 percent were vendors. The remain-

Predictions about the number of connected devices and associated revenues abound. Does the IoT hype reflect the reality in your view?

No
44%

Yes
56%
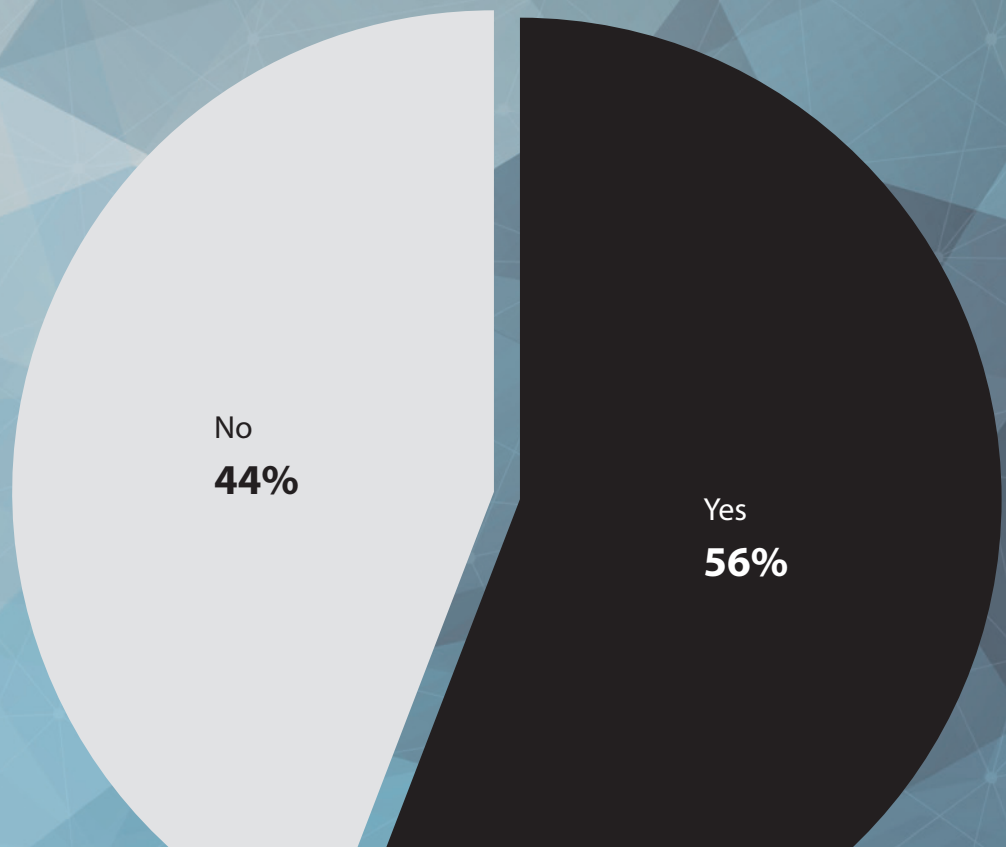
*All respondents

ing 34 percent work for other interested third parties, including analyst firms, SIs and trade associations.

The findings come amid continued frenzied activity, as operators launch new IoT networks and services to consumers and businesses.

"I think [the telecoms industry] is better positioned in terms of knowing what it needs to do to have a full IoT network infrastructure," wrote another respondent. "The gamble is investing at the right time to be market ready but not investing too much on technology that is still relatively immature."

Naturally challenges remain. Al-

> **It is quite possible some nimble technology company will disrupt the industry**

though agreeing that the industry is better placed today, one respondent noted: "Telcos are still struggling with incorporating the right partners."

More fundamental threats exist, according to another: "No path-breaking concept around the IoT

has been enunciated by the telecom industry as yet… It is quite possible some nimble technology company will disrupt the industry with a creative idea/solution."

Over the following pages, you can find other key findings from the survey, which suggest that while the industry still believes the hype it is less convinced then when we last polled our readers in Q4 2015. The survey results kick off our IoT special report, which also features an interview with Telefónica's Vicente Munoz and articles on security and the business models beyond connectivity.

> **"The forecasts may all differ and some may be overly optimistic but connected devices are proliferating, in one form or another"**

> **"The hype at its most extreme may be exaggerated both in volume and growth predictions, but there is a paradigm shift going on"**

> **"Partially true. There is growth but it is overestimated (as usual)"**

> **"Reality lags behind, especially in the B2B market, due to security concerns"**

> **"I can agree to the number of projected connected devices. However, I object to the overstated associated revenues"**

Are you convinced that operators can provide more than just connectivity services to the IoT?

No
31%

Yes
69%
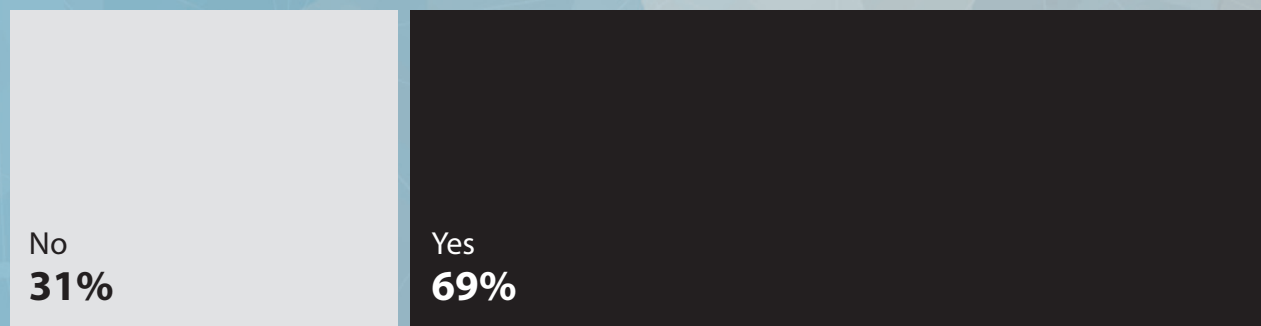
*All respondents

"Not unless they manage to introduce successfully new business models to leverage directly from their new IoT networks. Otherwise it will be the OTT story all over again"

"Yes, but through partnership with other innovative ICT businesses and the support of telco vendors. I don't think they can do it in-house without this"

"They can but are struggling with customer knowledge, partner landscape and business models"

"I think carriers can deliver more than connectivity. But most carriers will not adapt quickly enough to capitalise on the other services, ultimately leaving them as base connectivity providers"

Are you convinced the IoT can be a significant revenue stream for operators over the next five years?

No
37%

Yes
63%

*All respondents

B2B
73%

B2C
27%
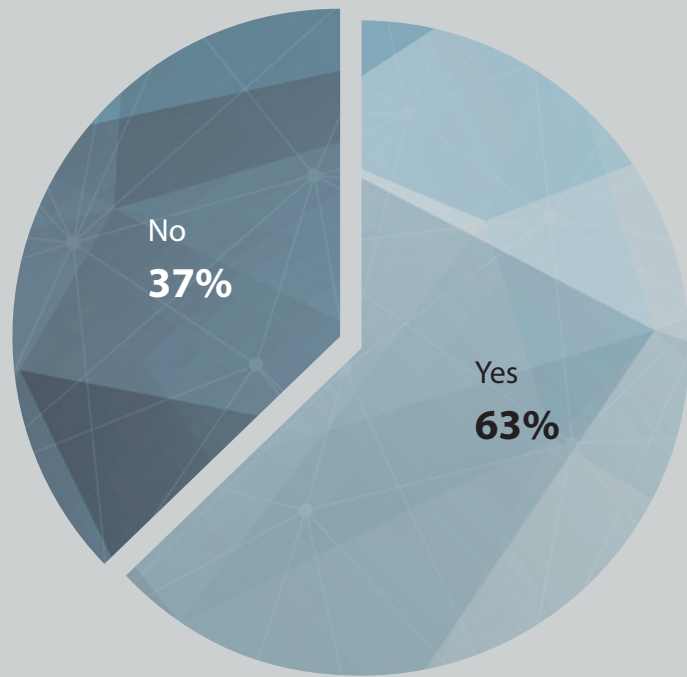
Which market do you think will offer the biggest IoT revenue opportunity for operators between now and 2020?
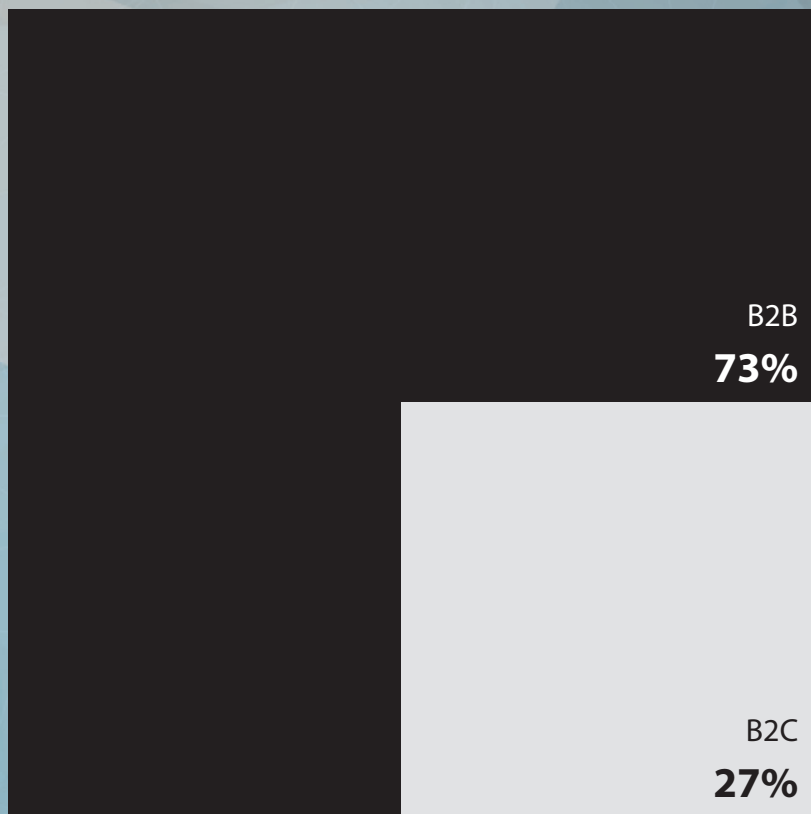
*All respondents

**Do you agree with the following statement:
"Operators will have to acquire companies
to succeed in the IoT space"**

Disagree
31%

Agree
69%
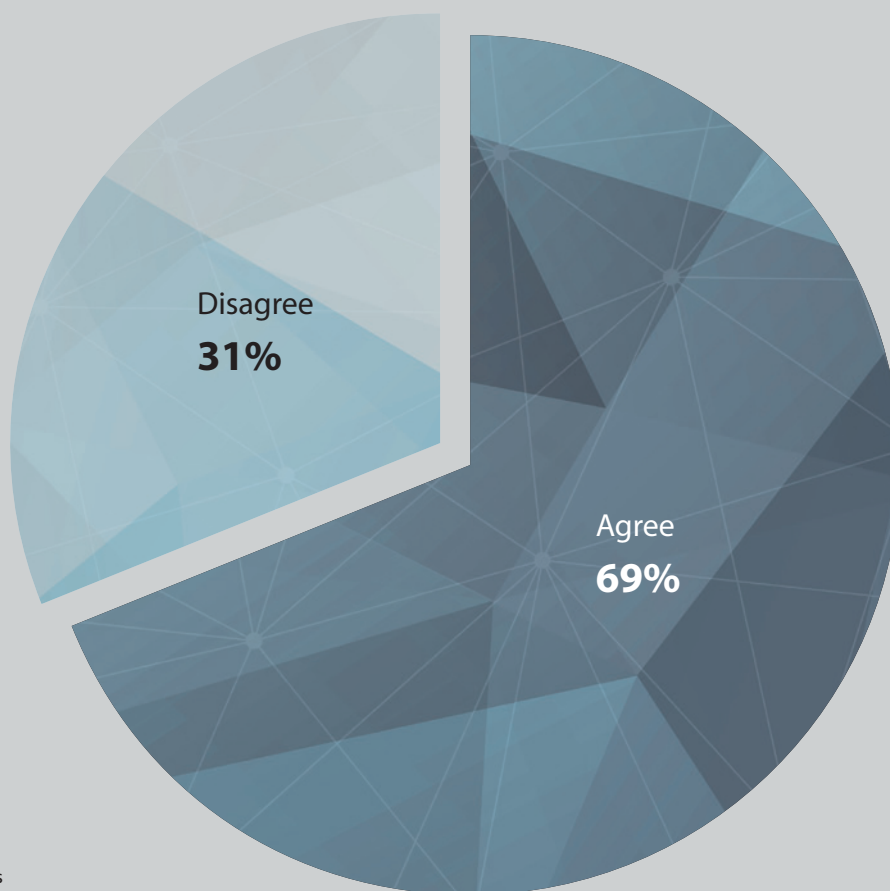
*All respondents

**"Absolutely, there is no other way to rapidly develop
vertical solutions"**

"In-house knowledge and agility is insufficient"

"They may cooperate, acquisition is not necessary"

How happy were you with the overall progress of your company's IoT performance over the last 12 months?

Neither happy nor unhappy

38%

Moderately happy

23%

Very happy

21%

Moderately unhappy

13%

Very unhappy

5%

*Operator respondents

"The take-off takes more time, effort and energy than foreseen"

"[Our IoT business] does not generate profit"

"We're struggling to incorporate the right partners"

Do you feel enough R&D/capex is being dedicated to the IoT in your company currently?

Yes
42%

No
58%
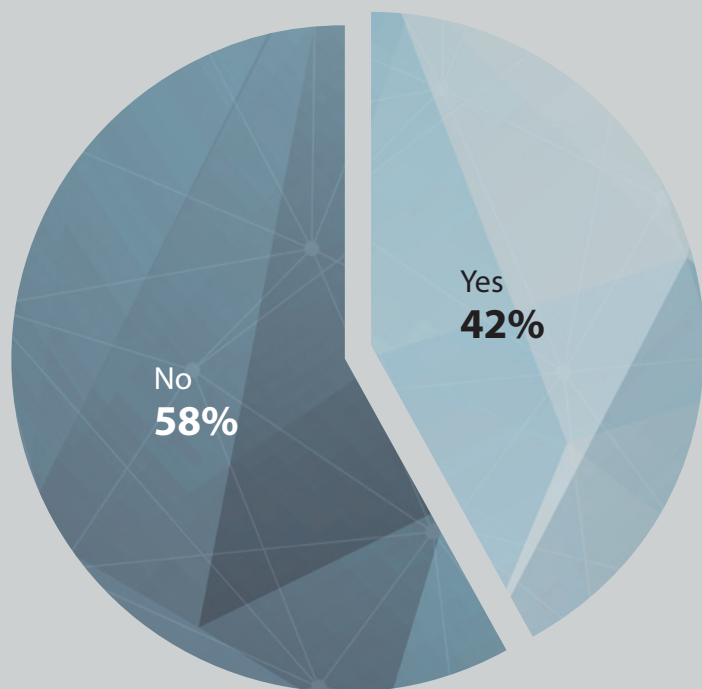
*Operator respondents

"R&D is not the issue, strategic venture participation is more efficient"

What percentage of overall revenues do you think is realistic for your IoT business to achieve over the next few years?

Less than 1 percent
3%

1 percent
5%

2 percent
5%

3 percent
21%

4 percent
5%

5 percent
26%

6 percent
3%

7 percent
8%

8 percent
5%

9 percent
8%

10 percent or more
11%

*Operator respondents

Are you concerned that the likes of Nokia and Tata have joined a growing list of non-telco providers that are offering IoT connectivity?

Yes, it is a threat to our IoT strategy
38%
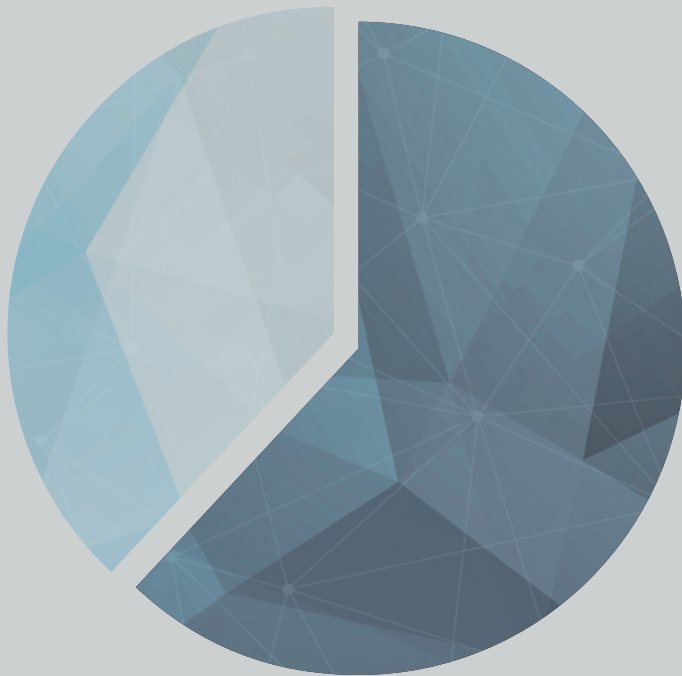
No, there is room for more competition/our offering is superior
62%

*Operator respondents

What do you regard as the biggest challenge to the success of your IoT business?

Developing the right business models
32.5%

Creating new services
25%

Developing the right partnerships
17.5%

Security
10%

Personnel issues/lack of skills
5%

Technology issues
5%

Lack of scale
2.5%

Other
2.5%

*Operator respondents

Telefónica Chief IoT Officer: Our best chance of success is a horizontal platform

Vicente Muñoz discusses Telefónica's IoT strategy, why partnering is key and how he is targeting profitability, with Marc Smith

From smart meters in the UK to connected cars in Mexico, Telefónica's Chief IoT Officer has a lot on his plate. Nevertheless, Vicente Muñoz is on message from the start of this interview. "The IoT is one of the key strategies to achieve our goal of being a data driven company," he says in response to a question about his role. "The IoT is in our DNA – we have connected homes and people. Now it's things."

He adds: "I like to say the internet of things of the people."

Muñoz has worked at the Spain-based operator since 2001 and has been responsible for its global IoT strategy since October 2015. Much of his opening gambit will be familiar to anyone with an interest in the IoT and how important telcos perceive it to be to their futures. The challenge is to get a firm grasp of precisely what they intend to do and how they intend to do it.

Although a drop in ocean of Telefónica's overall business currently, the IoT is a growing one. The company saw revenues from M2M services – Telefónica's financial reports still lack the IoT badge its dedicated business unit has been given – grow 22 percent in 2016 to reach €224 million. It does not share publically how many IoT connections it has around the world, but Gartner ranks it as the third best service provider behind Vodafone and AT&T.

Telefónica's IoT division is largely enterprise-focused and falls under the ultimate leadership of the group's Chief Commercial Digital Officer Mariano de Beer. "The IoT is more than a business area, it transverses the whole company," Muñoz says, name checking its links with Telefónica's innovation, security, big data and global resources arms.

The IoT unit has 120 people and, in common with 50 other telcos, its main offering is focused around the Cisco Jasper connectivity platform. Telefónica also offers device management, a Smart Business Control platform that collects and analyses the data provided by sensors deployed in the field, plus a Business Advisor service that aggregates and cross references information from a range of sources, such as devices, usage, charges and price plans.

All this provides the backbone for the operator's horizontal go-to-market approach, as evidenced by a deal

> " Cars will be the next living rooms… an extension of our relationship beyond the homes "

Telefónica struck with Nestlé last November. The food and drink multinational wanted connectivity for the coffee machines it provides to catering firms in 50 countries around the world. The solution Telefónica offered also included remote configuration and predictive maintenance capabilities.

Muñoz is betting this approach will drive his company's growth. "Our best chance [of success] is horizontal… to attack all the sectors – a huge base of customers from different sectors," he says. The Chief IoT Officer is not wedded to big beasts like Nestlé, however. "One of my priorities is to attack the SME market – to do this we need to reduce the complexity dramatically," he says.

Cars will be the next living rooms

The operator is also looking at specific verticals, notably automotive, energy, retail and smart cities. Muñoz cites the 2013 deal Telefónica won to provide connectivity to the UK's smart meter roll out as an example. The £1.5 billion contract has a 15-year duration and covers 30 million premises. The operator's O2 subsidiary began deploying technology for "one of the biggest IoT projects in the world" last year, Muñoz reveals.

In automotive, Telefónica won a deal in January this year to provide telematics to car hire company Hertz in Mexico. Muñoz says he plans to replicate this deal in other markets. "Cars will be the next living rooms… an extension of our relationship beyond the homes," he adds.

While Vodafone has won acclaim for its work in this sector thanks to its acquisition of Cobra, Telefónica has shown you can win through deals with partners. The operator worked with telematics company Geotab to win the Hertz Mexico contract. Geotab is one of a number of partners that Telefónica works with to deliver its IoT services. It breaks them down into three groups: device providers, systems integrators and industrial "experts". Telefónica also works with other operator partners as part of the IoT World Alliance. Back in 2014, this yielded another automotive scalp in the form of Tesla. The electric car manufacturer signed a range of connectivity deals with telcos, including with Telefónica in Germany, Spain and the UK.

Today, Muñoz suggests the GSMA is now the most important industry group. He sidesteps a question on the relevance of the IoT World Alliance – the group has failed to announce anything publically for over a year – saying the GSMA is "key"

thanks to its work on interoperability, standardisation and pricing.

There are three other elements to Telefónica's IoT offering: start-up hub Open Future, plug-and-play solution Thinking Things and Arduino, an open-source electronics platform used to develop interactive objects. On start-ups in particular, Muñoz says: "The capabilities and knowledge that they have is key, even from a commercial approach." Moving forward, Muñoz says security division ElevenPaths and big data arm LUCA are also being added to the IoT mix as it looks to provide a deeper offering.

While the discussion has focused around how Telefónica is serving enterprises thus far, the operator continues to eye the consumer market. In Spain and the UK, it has already gone further. Two years ago, Movistar offered a home security service featuring door sensors and video cameras as part of a "quintuple-play" product. Last year in the UK, O2 launched the country's first smart home offering, based on AT&T's Digital Life platform.

News of how these services are performing is hard to come by, but a new approach in Germany suggests Telefónica continues to search for the best method. Telefónica Deutschland launched a new company called NEXT in January that puts the IoT and "advanced" data analytics services at its core. Using software platform geeny.io, the operator plans to offer as yet undefined B2B2C IoT services. Nicolaus Gollwitzer, the former Global Head of Telematics at Vodafone, has been charged with leading the new company. Muñoz says more details about his "different approach" will be forthcoming.

All about the profits

In the meantime, the exec says his biggest challenge is economic. "It's all about profitability," he says. One way to deliver this is moving beyond the provision of connectivity. "We start with connectivity, work with [customers] to evolve this relationship to device and data management, and end-to-end

Vicente Muñoz (right), Telefónica's Chief IoT Officer, with Vicente Muñoz Jiménez, Commercial Director of Hertz AVASA México.

services and solutions," Muñoz says. While still "a key asset", the pipes are "not enough", he adds. Yet Muñoz struggles to provide concrete examples of how Telefónica is progressing here. As the Hertz Mexico deal has shown, the operator is reliant on other partners to provide some of the specialist services customers want with a corresponding drag on margins.

Does Telefónica need to acquire businesses to change this? "We are working to enrich our own capabilities, country by country," Muñoz responds. "We are working to create a strong IoT partner ecosystem – I believe more in that."

Despite the challenges, Muñoz is convinced of the technology's future potential. The IoT is "one of the enablers of the fourth industrial revolution," Muñoz says. Real progress is being made out there in the market, he adds: "One year

ago [the IoT] was an trend, a hypothesis, an option, now it is a must. [Companies] are discovering new areas that 12 months ago that they didn't see."

So how well is Telefónica positioned today? There is a clear sense from Muñoz that the company's IoT strategy remains a work in progress. If it can harness some of its disparate parts – notably big data and security solutions – it could have an offering that stands out in the market. But if Telefónica remains reliant on partners then Muñoz's profitability plans may struggle.

As with rival operators, Telefónica continues to announce a steady stream of IoT deals – albeit with a heavy connectivity bent – to show it is making headway. The market remains at an early stage, but it seems 2017 is a key year for telcos to refine their offerings if they are to start to make their way up the value chain.

IoT business models continue to challenge industry thinking

Choosing the right business model is essential if telecoms operators are to go beyond connectivity and capture a broader share of the burgeoning IoT market. James Blackman considers the options

The addressable IoT market for mobile operators will be worth around $200 billion by 2025, says Analysys Mason. Spending on straight connectivity will be just $28 billion, or 14 percent, of the projected total. The rest, or 61 percent and 25 percent of the spend, will go on applications and hardware, respectively.

"Participation in parts of the value chain beyond connectivity carries more risk, but also generates higher revenue," says Michele Mackenzie, author of the Analysys Mason report. "Mobile operators will face strong competition and will need to acquire, or partner, for new capabilities outside their core area of expertise."

Bengt Nordström, CEO at consultancy Northstream, chimes with Mackenzie on revenue share from connectivity – setting it at 10-15 percent of the total – but suggests the opportunity for operators, in general, may have been over-stated, or misread.

Even the largest and most advanced can look forward to taking only five percent of their revenues, at most, from the IoT market in the medium term, he says; tier two brands will make closer to three percent, and everyone else will struggle for a single-digit contribution.

The industry has been at it for ages with M2M after all, and the best of the bunch, the likes of Vodafone and Verizon, are currently only taking a single percentage from IoT. "It is important to have realistic expectations," Nordström says. "Investors would likely not celebrate this as 'game changing' but in a mature industry this is a welcome source of growth."

Horizontal vs vertical

Even so, such pressure should focus operators' minds on the strategic paths available to them, to take them beyond the traditional supply of airtime. In simple terms, these paths run vertically and horizontally, leading them to provide either a cross-market IoT platform for specialist providers, or targeted IoT services for specific markets, developed in-house.

Analysys Mason reckons the horizontal approach, which it describes as the provision of "basic tools and capabilities that developers can use to create IoT

> **" It is important to have realistic expectations "**

solutions", could increase the addressable market for operators to around $20 billion by 2025, or 10 percent of potential value.

It splits the vertical path into two, according to the complexity of the solution. Where operators offer platforms or capabilities that are tailored to a specific market, such as healthcare, the addressable market could be worth $10 billion, it says, or six percent of the total addressable IoT market.

Where they choose to go deeper with a single-market proposition, by offering an "end-to-end solution", they stand to capture a share of an entire industry's IoT value – as much as $19 billion in the case of fleet management, it reckons, or 10 percent of the total opportunity.

The automotive sector, covering fleet management and connected vehicles, is the primary area of interest for any big operator looking to play the vertical game. Vodafone, which has topped Machina Research's annual ranking of IoT telcos for the fifth consecutive year and claims to be the first to exceed 50 million IoT connections, has majored on just that.

It has got there because of its deep financial resources, as well as its strategic vision, and an appetite for risk. Vodafone bought Italian car technology firm Cobra Automotive, which develops 'black boxes' for cars, for €145 million in late 2014, and has duly positioned itself as a power in the sector.

Last year, its IoT revenues jumped 29 percent, to "closer to" €1 billion, on the back of its automotive play, as well as some tidy business in energy, manufacturing, and healthcare. On a larger scale, Verizon in the US has forked out almost $4 billion in the past 12 months on a trio of fleet management companies – Hughes Telematics, Telogis and Fleetmatics.

Nordström reflects: "Pursuing a vertical strategy requires a significant investment in technology, most often through acquisitions, specific competence, and brand visibility." Such options are not open to everyone. "Smaller operators find it hard to invest such resources, and are more likely to pursue a horizontal strategy," adds Nordström.

Tele2, a poster-child for the horizontal approach, says the big boys might have it wrong, and face stiffening competition in a developing technology market.

"You might take a larger proportion of the spend in the few deals you win, but you also increase your competition – not just from large players like Google, Facebook, and Microsoft, but from

hundreds of start-ups with very niche solutions," says Rami Avidan, CEO at Tele2 IoT, the Swedish operator's standalone IoT business.

It is easier to develop a specialist solution with an expert provider than to create one from scratch, he argues. "Is it feasible for any operator to take that gamble, and become the best of breed in any given vertical – not just from a go-to-market perspective, but from a technological one? No, that's not their forte."

So, does it make sense for any operator, in his opinion, to take a vertical approach? "Well, no, my view is it doesn't. But that's my view, of course, and there are exceptions," he says.

For its part, Tele2 is working "like

a full-service MVNO", with 700 IoT agreements in place, and customers in 165 countries. Rather than offering scale via standardised technology, it is doing so in partnership, by selling connectivity to leading IoT module maker Telit, for instance, which resells it as part of a more polished hardware and connectivity bundle in 50-odd countries.

Tele2 is punching above its weight, and playing in every vertical. "We cross them all. We have a clear aim to be a tier-one operator in IoT, and we're on our way to that," says Avidan.

Ireland's eir is taking the same kind of approach, momentarily at least, to provide a horizontal connectivity platform that can be applied to many different

industrial sectors. It plays to its heritage, it says, and gives it the widest view of the developing market. But it is also a stepping-stone. "Our ambition is to expand beyond pure connectivity," explains Damian Duffy, Head of Mobility at eir.

"The question is whether we get into a highly competitive vertical like transport, and try to carve out a specific area to operate in, or whether we look at some of the less well developed verticals, which may be smaller markets but offer the potential for higher margins."

There is a third way, which is to piggyback on others' IoT platforms. Nokia, for instance, has established a worldwide IoT network grid (WING) to help operators along the way. It works as

a global partnership of service providers, and allows them to offer white-label IoT services to enterprises, enabling a faster time to market, without major investments in platforms and networks.

"WING is a horizontal play that can serve extra-large enterprise customers in transport, utilities, safety, health and manufacturing markets. We are working with customers in these segments to bring their expertise to the table and define a more tailored approach per vertical," says Carlijn Adema, Head of Professional Services Marketing at Nokia.

Deutsche Telekom's Qivicon platform, which takes an OTT path to provide smart home services, also affords a white-label route to market, and has been adopted by KPN in the Netherlands and service providers in Norway and Slovakia.

Size buys choice, as well as flexibility; for the biggest operators, these two business models are not mutually exclusive. "A tier-one operator may pursue a mix of these two strategies – a vertical approach for some selected verticals and horizontal for others," remarks Nordström.

Enterprise vs consumer apps

It might be noted here that, with the exception of the Qivicon use case, all of the above-mentioned applications are enterprise-led, whether they are attached to a vertical or a horizontal business model. "The main customers to operators are enterprises," says Nordström.

Nokia suggests use cases and technologies have to be established in the enterprise market first. "The IoT consumer market is often driven by enterprises, so defining a good proposition for this group will help accelerate the consumer market," says Adema.

For operators, the application areas that have gained traction have tended to have a higher need for quality of service, high security, low latency, and reliable coverage, which has justified the cost of dedicated cellular LPWA connectivity.

Deutsche Telekom and Vodafone have led the charge with NB-IoT in Europe. The former talks up its new NB-IoT enterprise applications with German energy

service provider Ista, for heat sub-metering in homes, and with various Hamburg car parks, which will see 11,000 public and private parking spaces "digitised", so drivers can view, reserve and pay for them with a smartphone app.

This technological picture is messier, of course. No "single technological response" is appropriate on its own, says Pascal Ancian, IoT Programme Director at Orange. Cellular connectivity allows

> **" There's a clear return on investment for business customers rolling out IoT solutions "**

global solutions and coverage, it says, and is well suited for non-stationary assets, most notably connected vehicles.

Orange is backing LTE-M for licensed IoT access, but has a LoRa network in reserve in France for low bandwidth communications that "do not require high quality of service". It is providing LoRa-based LPWA connectivity to a VINCI motorway resting area in France, for example. VINCI gets live sensor readings telling it when waste containers need emptying or sanitary facilities require attention.

But again, these are business applications. Even where the final solution is sold to consumers, the initial deal is with large enterprises in most cases. Such a B2B2C model underpins many consumer-focused automotive applications, whether Deutsche Telekom's smart parking NB-IoT application, or Vodafone's connected cars and motorbikes.

Orange says it does not wish to pick favourites. "Our ambition is to cover both markets equally," says Ancian. But the automotive sector contributes 40 percent of its connected "things", and most are sold to enterprises in the first instance. Tesla, Hertz, and Renault are among the France-based operator's major corporate clients, which make available its network

to 5,000 customers as part of their fleet management services.

Back in Ireland, most of eir's IoT work so far has been with enterprises, but it says there is also a large opportunity in the consumer market, often via B2C partners. "Businesses are leading the way and have been for some time. There's a clear return on investment for business customers rolling out IoT solutions," says Duffy.

Operators' consumer IoT activity is generally focused on the smart home, and decidedly intermittent compared with their adventures in enterprise. Even Vodafone, which has claimed such progress in enterprise IoT, has delayed in the consumer market; CEO Vittorio Colao has stated 2017 will be the year for its consumer IoT play.

On the other hand, Deutsche Telekom, Orange, and Telia are among a growing list that have engaged in the consumer space already, having each introduced a smart home platform, giving open platform access to sundry home gadgetry and automated controls.

In Sweden, Telia has also just introduced a consumer IoT application for the car, called Telia Sense, an original cloud based solution that combines an app and an after-market piece of hardware. The idea is to connect-up older cars, which either pre-date the digital era, with 4G, Wi-Fi and partner services such as maintenance, insurance and roadside assistance.

But it is a tough gig, facing off against major brands in the consumer-led automotive and residential markets, whether iconic motoring brands or the new gods of tech. "Consumer is much more challenging, and has so far been dominated by agile OTT players," remarks eir's Duffy, pointing to products like the Amazon Echo and Google's Home and Nest connected home devices.

"Various companies are trying to build gateways for specific solutions but I think it will take a giant like Amazon, Google or perhaps Apple to hit the critical mass necessary for success. Highly regulated industries such as healthcare, banking and security are the best avenues for operators to approach consumer IoT," he says. 🔲

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The security of things

If security isn't designed into the fabric of IoT-based services, the costs could outweigh the benefits. Sue Tabbitt reports

If anyone had lingering doubts about the security risks associated with the IoT, the news late last year that hackers could gain control of two internet-connected toys via a mobile phone and talk to children through them should have put paid to them.

The flaws found by the Norwegian Consumer Council in the My Friend Cayla doll and i-QUE robot are extreme, but pertinent as telcos look to push forward with their IoT strategies. Operators need to worry about security more than most given their role as the transporters relied on to get data safely from one point to another.

"With a highly centralised system like the cloud you know what you're protecting, but in a vastly distributed scenario – as with the IoT – there are many more points of vulnerability," notes Ian Hughes, an analyst at 451 Research.

Vodafone provides a broad sweep of the IoT space in its annual Barometer report, which includes insight into what companies are doing and thinking about the technology. Phil Skipper, Vodafone's IoT Head of Business Development,

> **" The speed to market with IoT devices has been to the detriment of security "**

acknowledges that IoT security needs an end-to-end approach. "Our 2016 IoT Barometer showed that 76 percent of businesses agree with this," he says.

Skipper says Vodafone is helping customers "in a number of ways" when it comes to security. "By owning the critical parts of the infrastructure that supports

the IoT - from the SIM card, through the dedicated IoT network, to the data centre - we ensure that our customers benefit from seamless security without needing to managed multiple providers," Skipper explains.

Vodafone also separates its IoT subscribers' data from public internet traffic, and encrypts data that passes over its mobile networks into the network core by default, he says. "We ensure that our security policy frameworks are aligned with international standards, and our data centres which host the managed IoT connectivity platform are implemented across geographically separated sites with redundant hardware and automatic failovers."

In addition, Vodafone's platform gives customers a real-time view of their entire IoT estate and can provide alerts of any anomalous activity, offering customers the chance to remotely disable any compromised device, Skipper notes. If operators want to garner companies' confidence, a comprehensive approach is vital, he says.

In February, a group of telcos, vendors and IT companies established the IoT Cybersecurity Alliance to get a handle on

what is happening. One of its immediate aims is to understand the diverse security challenges along the data chain as everything from cars and kettles to personal health monitors and home lighting systems become connected to the internet.

AT&T is one of the founding members of the new international alliance. Kelley Duarte, VP for IoT & Strategic Services in EMEA, puts some numbers to the risks. "In the past three years, AT&T has seen a 3,198 percent increase in hackers scanning IoT devices for vulnerabilities," she says. Meanwhile, an enterprise survey by AT&T in 2016 found that 58 percent of companies lacked confidence in the security of their IoT devices. The Alliance aims to change that perception.

Cultural differences have a bearing on how individual markets respond to the IoT threat/opportunity ratio. Angela Salmeron, an analyst at research house IDC, notes that while markets such as the US and the UK are very open to what's possible, other countries such as Germany are inherently more risk-averse.

"In Germany the government banned the [My Friend Cayla] doll at the centre

of the security concerns last year, for fear that hackers could spy on children," she says. "The country is so security and privacy conscious that it tends to be ahead of what's needed."

However, such consciousness couldn't stop Deutsche Telekom falling victim to the Mirai botnet, which attacked 900,000 of its routers last November. In common with most of its peers, the Germany-based operator's IoT strategy is focused on the enterprise market currently, through its T-Systems division. "The speed to market with IoT devices has been to the detriment of security," says Scott Cairns, CTO and Chief Digital Officer at T-Systems. He likens the situation to the early days of public Wi-Fi, when criminals could intercept wireless data in transit because it was unsecured.

T-Systems aims to apply German security standards to the IoT ecosystem through secure, Europe-centric cloud services. Following the launch of a public cloud offering in Germany last year, T-Systems and its technology partner Huawei plan to tackle the IoT hardware and database/application market with platform (PaaS) and software (SaaS) services, all within its secure data centre environment where everything from IoT controls and data analytics can be concentrated.

Cairns says: "Everything we do is based on security." That means including security features from the start so that it doesn't become a trade-off with battery life, for instance, and working with partners who are experts in their own fields. "We've partnered with Roambee, for example, who are great with sensors/collections of devices and security, complementing our expertise in data transmission," Cairns notes.

As the exec notes, one of the challenges with IoT devices is that they are designed to have a long life expectancy. This can lead to outdated security, encryption erosion, and unsupported anti-malware software. "Improper password management also presents a threat to IoT devices," says Gerald Reddig, Head of Security Portfolio Marketing at Nokia.

Touting the Finland-based vendor's NetGuard Endpoint solution, he adds: "By immediately detecting and proactively mitigating infected IoT devices, [operators] can maintain service quality and limit erosion of their brand."

Expecting device manufacturers to be on top of end-point security is risky because, until the IoT opportunity emerged, these companies did not need to be experts in connectivity and data security, so they are still on a learning curve.

"Service providers, therefore, have a responsibility to ensure their production network is secure and can be monitored to help isolate any devices that may pose a risk – so they can be contained," says Terry Greer-King, Director of Cybersecurity for the UK, Ireland and Africa at Cisco.

Sophie Bessin-Py, Marketing Communications Manager at digital security vendor Gemalto, warns that strategies need to include remote management of and updates to IoT solutions. "The deployment of a robust, upgradeable IoT security framework from the ground up should be seen as an insurance for the future," she says. "The result of a cyber-attack on a weak security infrastructure can have very harmful consequences."

"The advent of the IoT has brought with it huge security concerns for telecoms operators," agrees Ultan Kelly, Senior Director at Cobham Wireless. "And in future, attacks could be far more severe than simply cutting off internet services. Security breaches of online business systems such as those used in hospitals, interconnected electrical grids and other public services, could jeopardise the safety of society on a far wider scale. Ensuring network security is particularly pertinent with the introduction of new connectivity standards for IoT, such as NB-IoT, LoRa or Sigfox," he adds. "Operators must be aware that these connectivity networks will be just as vulnerable as current network standards, like LTE or Wi-Fi, as hackers look for new modes of attack against operator networks."

Diversity also extends to specialist offerings, from satellite connectivity

An opportunity as well as a threat

Operators should see IoT security as an opportunity as well as an obligation. Gartner suggests that while the total market is currently quite modest, IoT security is likely to be worth $840.5 million by 2020. "Organisations that deploy IoT [services] are looking for providers to step in and offer managed services," notes Stephen Gates, Chief Research Intelligence Analyst at NSFOCUS, which provides intelligent hybrid security solutions. "Providers are beginning to develop new revenue-generating offerings designed to help organisations protect their own IoT devices."

These might include scanning services, designed to find unsecure IoT deployed in their customer's networks – before hackers do. At Tata Communications' security operations centres, teams of engineers monitor attacks as part of a managed security service. "The best form of defence is attack," says Srinivasan CR, Senior VP of Tata's global data centre and cloud business. "It is better to anticipate problems and deal with them in real-time."

to M2M communication in industrial environments, vehicle-to-vehicle and fleet tracking solutions in automotive, to asset/pet/child tracking solutions in the consumer sector, notes Shaan Mulchandani, Director of Security at Aricent, which provides design and engineering expertise to telcos as well as IBM, Microsoft and Amazon.

It all adds up to a very complex picture, especially coupled with other operator targets around SLAs, low latency, network elasticity and the need to integrate with third-party cloud/application providers.

The key is to treat security as a value creator, Mulchandani claims, suggesting that operators focus on a few strategic initiatives, and get stuck into the emerging industry alliances which will allow them to form "vetted ecosystems" where holistic security considerations are made across device, connectivity and cloud layers. 🆔

Deutsche Telekom sends execs back to school

Deutsche Telekom has teamed up with America's Duke Corporate Education business school to improve the digital skills of its managers. The two organisations have developed a year-long digital leadership program, levelUP!, as part of the operator's digital transformation agenda.