DIGITAL TRANSFORMATION: THE CLOCK IS TICKING

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EXECUTIVE SUMMARY

Digital transformation is a topic on almost every organisation's mind as a confluence disruption pours over the business terrain. New technologies in the shape of the Internet of Things (IoT), 5G mobile networks, artificial intelligence (AI), augmented and virtual reality (AR and VR), virtualisation and automation are enabling new business models, new ways of offering products and services, new processes and new ways of collaborating and competing. Digital transformation is therefore an umbrella term that covers multiple dimensions and directions of travel simultaneously, sheltering technologies, business models and processes under its canopy.

For this reason we split our survey into five sections. We began with the opening section on digital transformation itself before exploring the constituent parts of digital transformation which we identified as: network transformation, business transformation, operational transformation and experience transformation.

Each section contained a series of questions designed to illustrate where our more than 500 respondents see the key challenges and opportunities in each of these areas. We also asked them where they were in their transformation journeys and how quickly they expect to make progress over the coming years.

We began by asking why organisations are engaging in digital transformation. This is a multi-layered question that encompasses those who want to be seen as pioneers, those who face business challenges that require them to transform, those who are technology enthusiasts and those who fear being left behind if they don't transform. However, the main motivation was money. More than a quarter of respondents – 27% – selected the goal of increasing revenues as their main motivation for selecting which digital initiatives to pursue.

The financial theme continued in the networks section when we asked respondents why they are automating or planning to automate their networks. This time, achieving a reduction in operating expenses was cited by the largest proportion of respondents (49.7%). However, revenue generation or cost savings are not the only motivators. More than a quarter of respondents (29.9%) said they were looking ahead to new opportunities and selected improving time to market as a reason for using automation.

In the service transformation section we asked whether respondents thought mobile operators are well placed to enable digital transformation business models for other organisations. Encouragingly for the operator industry, 62% of respondents felt that mobile operators are natural partners for their organisations. However, the remaining 38% of respondents feared operators would not be able to transform themselves quickly enough to build on their current relationships.

This led neatly into our fourth section on operational transformation, which will be vital if operators are to metamorphose from being connectivity providers to become digital enablers. We asked if there are sufficiently skilled personnel available to enable operational transformation and only 35.5% of respondents felt there were. The industry will have to upskill significantly to support operational transformation at the pace that wider digital transformation is demanding.

Finally, we looked ahead to the transformed experience. The goals of digital transformation are to enable organisations to transform how they operate so product companies become service companies and others can enter adjacent markets or redefine their roles in the value chain. However, there are societal as well as business goals and the rewards of digital transformation in the form of new revenues will only be earned if the transformation provides attractive new and improved experiences to users.

Respondents are well aware of the leading transformation technologies but our survey revealed a growing impatience to see these out in the market place. 45.2% stated they expect to see the fruits of digital transformation before 2020. For all involved, whatever their perspective, the digital transformation clock is ticking and, across all the disciplines involved, there's a need for speed that is becoming increasingly apparent.

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DIGITAL TRANSFORMATION

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> “Service providers all over the globe are embarking on a transformation from communications service providers to digital service providers.

While much of the focus of digital transformation is on the digital customer experience, it is quite clear from this survey by GSMA's Mobile World Live that a key motivator for digital transformation – cited by 27% of respondents – is actually to drive more revenues.

The survey provides some very interesting insights into the strategies that they will employ to generate that revenue. In order to generate more value from their customers, service providers have to expand their portfolio of offerings, often by partnering. These partnerships may include OTTs which have traditionally been seen as rivals or disrupters for service providers, but were seen by 59% of survey respondents to be potential partners. Another key strategy noted by nearly 33% of the respondents was the need to reduce time-to-market. The importance of that goal may explain why marketing departments featured so prominently as departments driving digital transformation.

These findings coincide with Amdocs' belief that the 3 main imperatives for service providers in transforming to providers of digital services are:

Launching digital services with accelerated time to market

Enriching their offerings with digital services from 3rd party partners

Monetizing these new offerings with flexible cloud-based monetization systems

In late 2017, when our survey was running, it was already abundantly clear that the telecoms industry is well-advanced in an industry-wide evolution that is changing it from a physically-oriented networking business into a virtualised player in the wider digital ecosystem. However, the progress made so far really only scratches the surface of complete, full scale digital transformation and mobile operators need to maintain their focus and momentum if they are to continue to digitally transform and maximise their future transformations. The scale and scope of this effort should not be underestimated as it disrupts business models, company cultures, personnel and established, deployed, technologies.

We therefore decided that a great place to start our survey would be to probe what selection criteria respondents have for choosing which digital initiatives to pursue. Unsurprisingly, respondents' main motivation – selected by 27% – was to increase revenues. This is vital for operators as markets and growth from new subscribers saturate at the same time as revenue from traditional services commoditises. The flipside of the same coin was also revealed, with reducing costs chosen as a selection criteria by another 24.7% of respondents. These responses clearly show the pressure operators are under to increase profitability through reducing costs and increasing revenues.

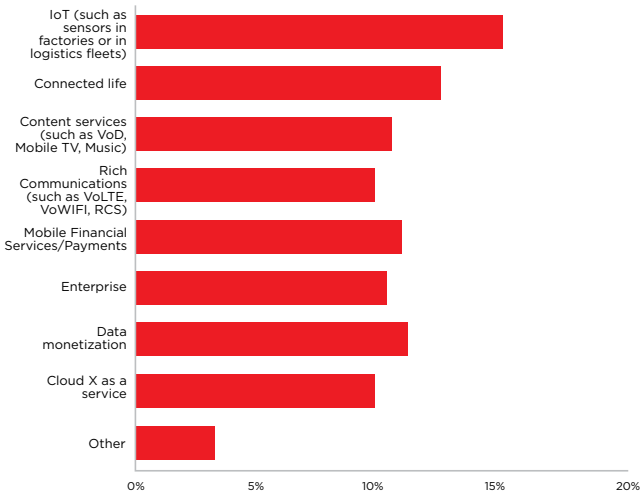
However, digital transformation offers more than that and this was borne out in the survey responses: 20.6% of respondents said a key selection criteria was to show innovation to the market. This suggests operators know they need to demonstrate that they are embracing new services and models and are the natural supplier to customers for enabling services and technologies. Even so, there was an acknowledgement that it will be challenging to achieve differentiation in the convoluted and complex digital value chain as 25% of respondents said that a key motivation was to support the must-have capabilities demanded by their customers. Operators therefore know there are some capabilities they simply must have if they are to succeed and these score near-equal importance alongside increasing revenues and reducing costs.

We then wanted to understand how operators are structuring their businesses to manage the digital transformation process. To gain insight into this we asked respondents to select all departments involved from a list that included IT, sales, marketing, customer care, finance, legal and operations. The departments most selected were IT (20.6%), operations (17.8%) and marketing (15.7%). The appearance of marketing in the top three departments is significant and we expect this relates to utilising digital transformation initiatives to enable new offerings and services. The input of marketing is vital to ensure these can be sold successfully.

Next we delved deeper into the complexities of competing effectively in the digital economy. Operators have enabled this economy to exist but few are digital native organisations themselves. We therefore asked respondents what they see as the biggest barrier to competing effectively in the digital economy. Almost a quarter (24.6%) said their organisational structure and the collaboration between IT and line-of-business was the biggest barrier. This was closely followed by legacy systems (21.9%) demonstrating new technical platforms are required for the efficient operation of digital services. Significantly, insufficient budget was highlighted as a major barrier by only 11.2% of respondents, suggesting that funding will be found for transformation initiatives that can demonstrate return on investment (RoI).

The types of services respondents are looking at delivering as part of their digital transformations demonstrates the sheer scale of the digital transformation the telecoms industry is undergoing and the reach of its effects across a business. We asked which product offerings are part of respondents' strategic focus and found a wide distribution of responses, with IoT selected by the largest percentage of respondents (16%), as shown in the table below.

Which of the following product offerings are part of your strategic focus?



We then asked our respondents to reveal their strategy for handling providers of over-the-top (OTT) services that run over their networks. This is a dual strategy that will see operators, enabled by digital transformation, offer their own OTT-style services and compete directly with OTT services. We asked them to select which of three strategies best describes their own OTT strategy and the majority (52%) said their strategy was to partner with OTTs to enhance their own product offering. The foe is becoming friend in the digital economy.

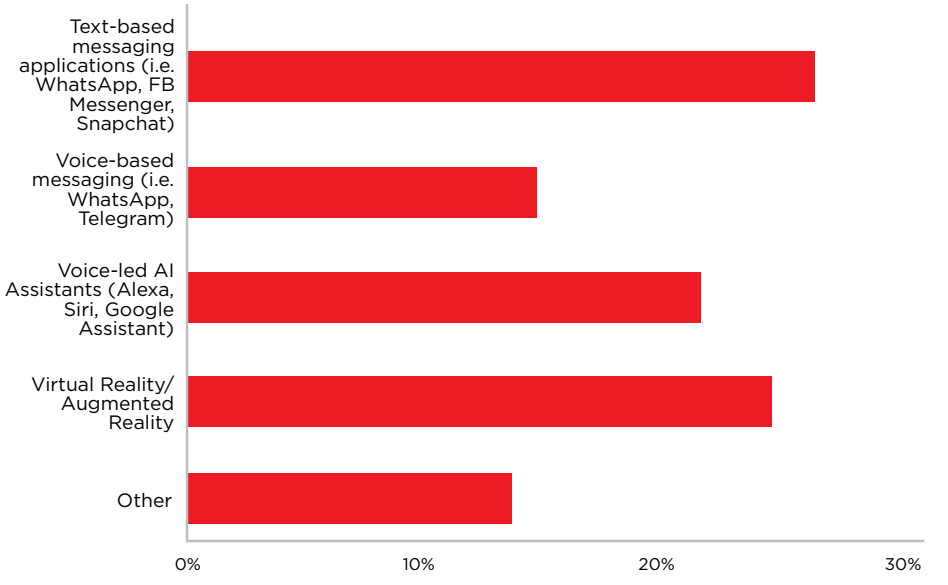
However, a significant proportion are still gearing up to compete with OTT providers. 22% of our respondents said their strategy is to release their own products to compete with OTT offerings. A final sector of respondents were looking to white-label OTT services to include in their portfolios, seeking out a middle ground of being associated as the providers of attractive services to their customers but partnering with OTT service providers to gain the capability to offer such services.

Next, we sought to assess the readiness of respondents to support customers consistently across different channels. We asked if they had a single digital engagement platform for sales-related (commerce) and after-sales customer (care) support. Reflecting the relatively early stage the telecoms industry is in when it comes to digital transformation, 44.3% of respondents said they did not. However, the majority did, either having developed a home-grown platform (30%) or having acquired a single digital engagement platform from a vendor (25.7%).

The new choices and far wider service portfolios set to be enabled by digital transformation will necessitate greater automation and self-service if provision is to be done profitably. We therefore explored how organisations are encouraging greater adoption of self-service customer interactions. We asked if respondents' organisations had a target percentage for these in the next year. The largest proportion of respondents (48.3%) said they did not have a target and those that did have targets were at the low end of the range – typically less than 50% self-service in the next 12 months. In fact, just 6.5% had a target of converting above 70% of customer interactions to self-care in the next 12 months.

Nevertheless, new channels are being examined as we uncovered when we asked which future additional engagement channels respondents are assessing. Both text-based messaging, selected by 26.2% of respondents, and virtual or augmented reality applications, selected by 23.8% of respondents, are leading the field here, but voice-led artificial intelligence assistants – or chatbots – such as Alexa, Siri or Google Assistant are being looked at by 21.5% of respondents.

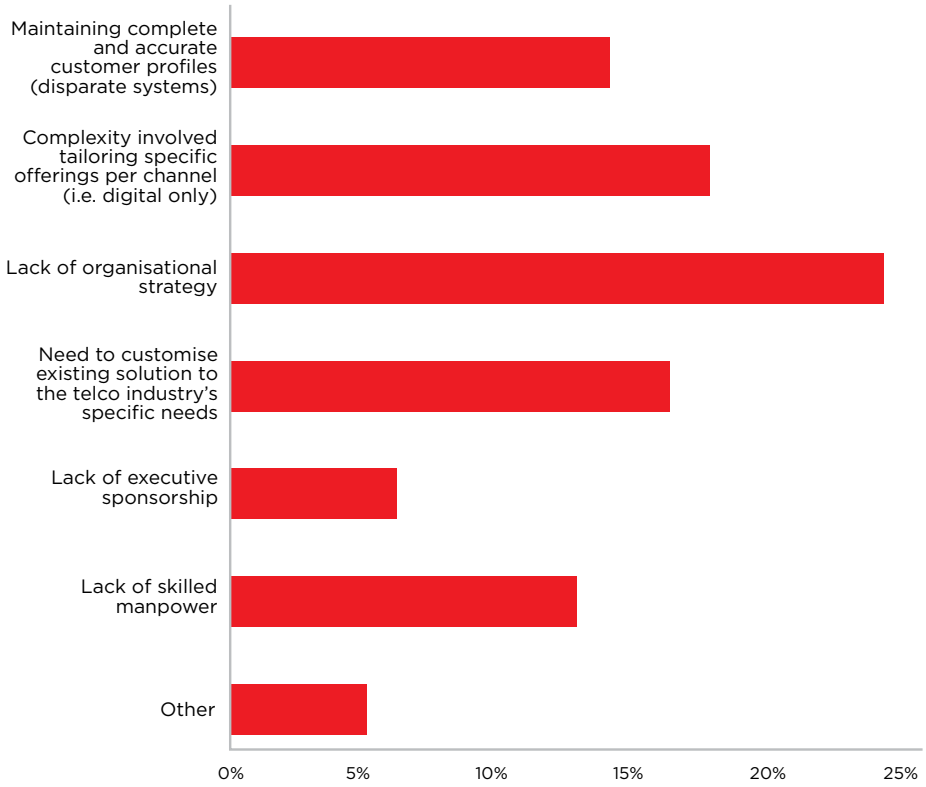
What future additional engagement channels are you exploring?



To gain further insight into this, we asked respondents what they see as the biggest challenge to implementing new engagement channels and AI solutions. The most widely selected response was that lack of organisational strategy was the largest challenge, which was chosen by 24.8% of respondents. Next most selected was the complexity involved in tailoring specific offerings per channel, which was chosen by 19% of respondents. Other concerns raised included the challenge of maintaining complete and accurate customer profiles across disparate systems (14.5%), the need to customise existing solutions to the telecoms industry's specific needs (16.6%), lack of skilled manpower (13.1%) and lack of executive sponsorship (6.55%).

These responses indicate that, while there is substantial interest in new channels and AI, activity is currently confined in terms of rolling it out to the mass market. We estimate the complexity and potential investment burden is holding organisations back and there, perhaps, needs to be greater awareness of the potential benefits at higher levels within operator organisations for the next step to be taken.

What is your biggest challenge to implementing new engagement channels and AI solutions?



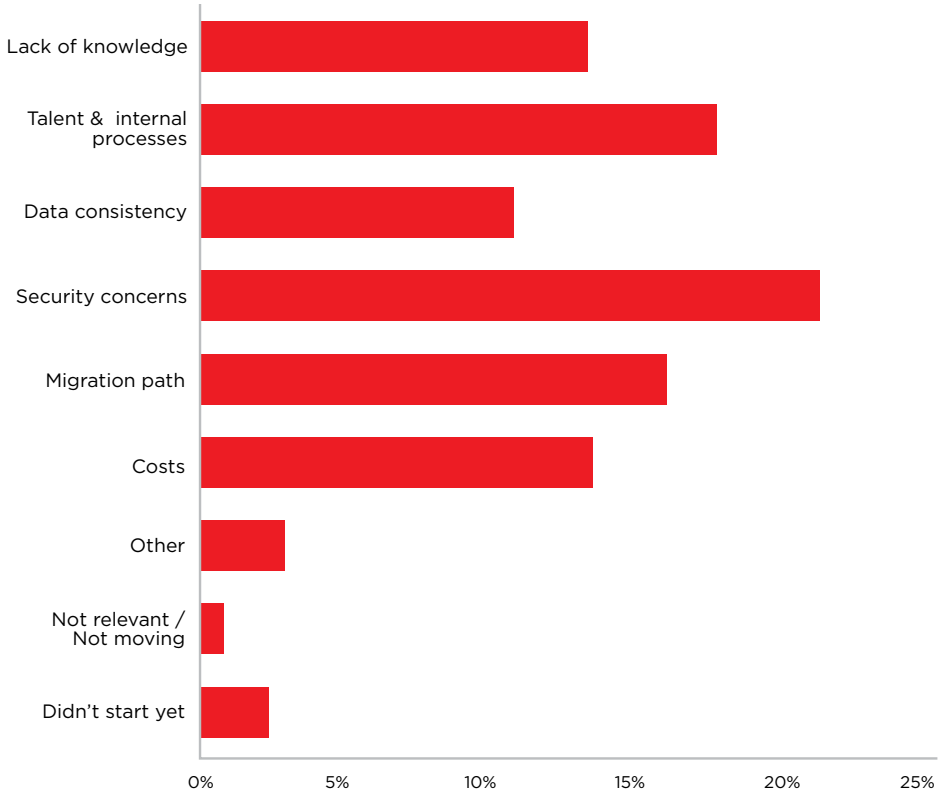
Next, we took this line of thought further and asked respondents what use cases they plan to utilise AI in. We asked them to select from a list that included: personalised and contextualised engagements, sentiments analysis, virtual agents such as chatbots, adaptive customer journeys, improving operational processes, network resource allocation optimisation and customer care.

The largest proportion of users (19.8%) selected improving operational processes as a planned use for AI. Next most popular was customer care (16.3%) and virtual agents (15.6%). Network resource allocation optimisation and adaption customer journeys were also on many respondents' radars, being selected by 13.6% and 12.5% of respondents respectively.

The more marketing focused disciplines of personalised and contextualised engagements and sentiments analysis scored less prominently, but respondents were aware of them with these being selected by 10.8% and 7.3% respectively. From this, the conclusion we make is that there are many use cases for AI and each has potential advantages. However, this can be seen to be hampering some operators in securing investment and in making commitments to each of these disciplines.

We then moved on from AI to look ahead to the challenges that operators face when moving to digital technologies such as cloud and microservices. We asked which of the following issues listed in the chart below were seen as the greatest challenges and found that security was the greatest concern, followed by talent and internal processes. It was revealing that a small percentage of users (close to 3.5%) said they either hadn't started yet, thought the question was not relevant or don't plan to move to cloud and microservices technologies.

What are your greatest challenges when moving to digital technologies such as cloud and microservices?



In addition, we thought it significant that costs were seen by only 13.6% of respondents as a great challenge. We think this demonstrates that there is widespread understanding that cloud and microservices will drive efficiency and cost savings as part of an organisation's digital transformation. We were also pleased to note the prominence given to security, which suggests real thought is being devoted to the topic by respondents as they assess the implications of running a complex, high volume environment of microservices in the cloud.

A part of the digital transformation challenge that cannot and should not be underestimated in the coming years is that for operators there is so much going on and so many different elements and activities involved that make up digital transformation. To explore this, we asked respondents what their organisation's most important technology strategy is for the coming year.

The largest proportion of respondents (32.9%) said their most important strategy was to reduce time to market for new capabilities and increasing the amount of releases [of new products or services] per year. The importance of this response is that it demonstrates the need to get to market and take share quickly is understood. Operators know that if they don't accelerate service launch, rivals will and they could potentially lose some of the substantial opportunities inherent to the digital value chain.

The next most popular strategy was virtualising network functions. This was selected by 21.3% of respondents, who appear to have embraced the cost saving aspects of virtualisation but also have taken on board the flexibility and agility of virtualised environments which will be vital to enabling the rapid service instantiation required in the digital era.

Third most popular was to move more applications to the cloud. The 20.8% who selected this appear to recognise that apps are moving to the cloud, but also see that this is an ongoing journey and the pace cannot be allowed to slack off.

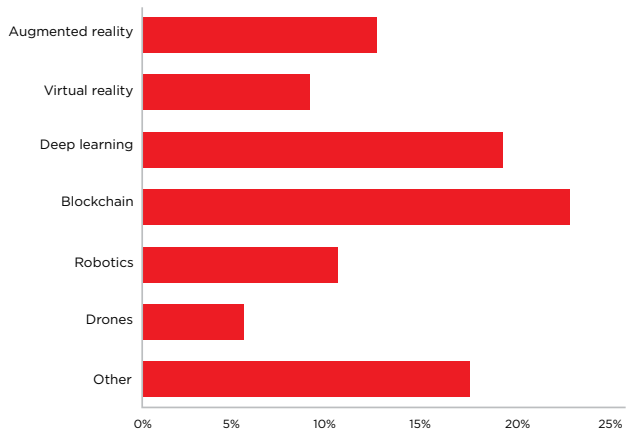
Finally, 17% of respondents identified embracing AI capabilities as the most important strategy. This indicates that while AI is seen as of future value, for many 12 months is too little time for it to be relevant in their business. We anticipate that a future survey would have a different result.

Remaining with the theme that there are many pressures on operators and many investment and strategic decisions to make, we turned to the issue of 5G deployment, the earliest of which will take place in 2018. We wanted to identify where the mainstream operator sector is in its 5G migration, so we asked what stage companies are at. Unsurprisingly, the majority of respondents (40%) said that 5G is currently out of their scope. However, 19.5% said they were performing proofs of concepts with vendors and 30.5% were establishing their strategy and examining the relevant use cases.

Standards for 5G are likely to take several more years to emerge but a small percentage of our respondents (9.9%) said that, in spite of the delay, they were waiting for 3GPP standards for 5G to be completed.

Finally, in this section of the survey we asked respondents to take a longer look ahead and tell us what future technologies they are exploring. Many of the technologies we have already discussed were selected, but blockchain and deep learning were selected by the largest percentage of respondents with 22.9% and 19.3% of respondents choosing those technologies respectively. The chart below shows the other technologies that were highlighted by our respondents.

What types of future technologies are you exploring?



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NETWORK TRANSFORMATION

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"The ever more competitive digital economy requires that applications be delivered with unprecedented speed, scale, and agility. Service providers are deploying Network Functions Virtualisation (NFV) to create new services and business models to increase service agility and flexibility, and to increase network efficiency. It is not surprising to see that business factors, such as the ability to drive new revenue or reduce OpEx or CapEx, were selected as the reasons by the largest proportion of respondents. This directly impacts reasons for vendor selection, as providers look for vendors that are proven and trusted to help deliver business results.

Security is still the biggest challenge to deploying NFV. Of security capabilities not deployed but being considered in the next 12–18 months, we see a fragmented approach with many different security implementations but the data suggests there is no clear direction or one solution that fits all situations. Web Application Firewall (WAF), DDoS protection / mitigation, anti-fraud measures (e.g. DNS tunnel detection), and GPRS Tunneling Protocol (GTP) firewall stand out.

Looking at applications and new delivery methods, 34% of our respondents said they had no specific plans to optimise video. We expect some of these respondents to look to seek control over video (on TCP and non-TCP protocols like QUIC) over time. And, 5G is coming. 86.6% of respondents see opportunities in 5G and most understand that they will need to upgrade their networks – Mobile Edge Computing in particular.

In order for the promise of complete digital transformation to be realised, transformation in the network is a critical ingredient. Operators have been moving towards this for several years now, increasingly selecting IT-oriented technologies such as software defined networks (SDN) for their next generation network platforms. While still important, traditional network engineering is therefore changing emphasis within operators as they look to introduce new applications and services, and to run their operations in lean, flexible and agile ways.

There's a two-sided approach emerging within operators that is seeing greater efforts towards virtualisation with growing commitments to network functions virtualisation (NFV). As this continues, IT will move towards open source systems and increased utilisation of cloud platforms. For different operators in different markets this will all happen at different paces, but we wanted to survey our respondents to ascertain the general direction of travel from across the industry.

First, we asked how is digital transformation influencing your application decisions? This uncovered significant impacts with almost 40% of respondents stating that digital transformation is changing how they develop applications, for example by moving to agile. That's a fundamental shift and one that is vital if operators are to compete directly with the developmental pace of large web companies. A typical impediment to operator success in the past has been the total focus on lengthy testing and trialling to ensure a service is telco-grade while companies such as Google simply release a beta version of a similar product months, if not years, before an operator does so.

This response indicates that operators are grasping the concept of doing things not only at web scale but also at web speed. To achieve this, they're turning to technology and 27.3% of respondents said they are applying automation and orchestration to their systems and processes. This again demonstrates that operators understand the need for speed and identify automation and orchestration as the means to bring new offerings to market while simultaneously ensuring good quality of experience for customers.

However, this acceleration is not without challenges and our respondents recognised that they are under significant pressure to transform their application approaches. 14.1% said they see pressure to adopt open source technologies while 15.2% said they see pressure to update their applications more frequently.

We see this heightened awareness as encouraging and demonstrative of a new familiarity and acceptance of new models, apps, services and technologies post digital transformation. It's acknowledged that the path will not be easy or without pressure, but the path appears to be reasonably well marked.

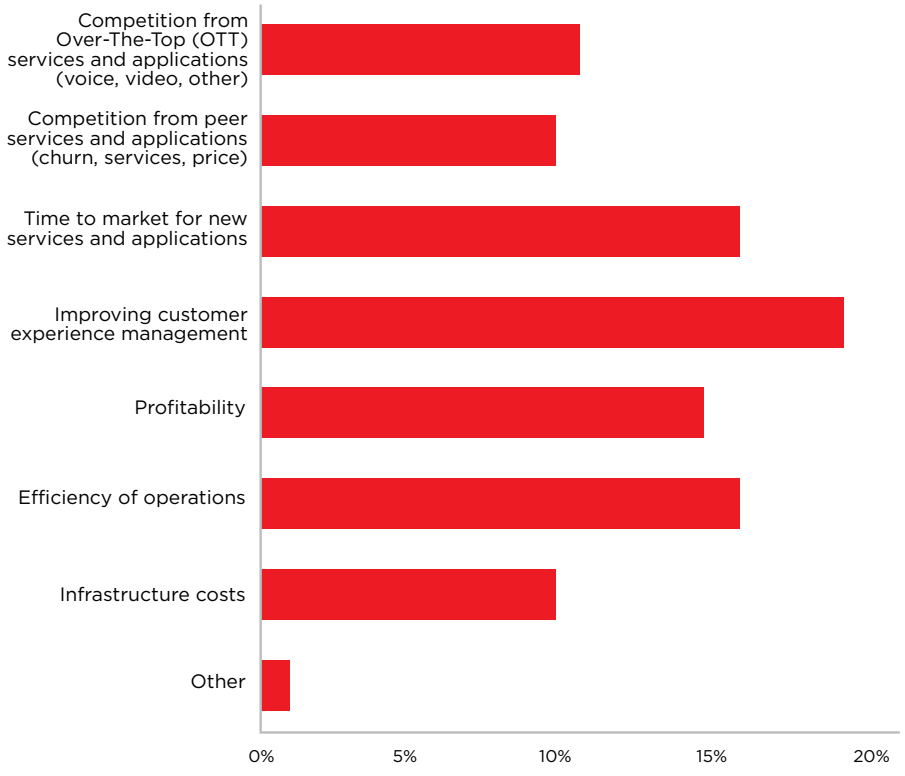
"There's a two-sided approach emerging within operators that is seeing greater efforts towards virtualisation with growing commitments to network functions virtualisation (NFV). As this continues, IT will move towards open source systems and increased utilisation of cloud platforms."

We then moved on to ask why respondents are using automation. Unsurprisingly, the most widely selected response was to reduce operating expenses. This was selected by almost half (49.7%) of respondents and reflects the pressure operators are under to reduce the cost of operations. However, the next most widely selected response – improving time to market, which was selected by 29.9% of respondents - revealed that operators are looking ahead to the new opportunities opening up to them as a result of digital transformation.

In addition to getting to market quickly, respondents want to do so with the capability to serve the mass market. 12.7% of respondents said they are using automation in order to be able to scale up to meet demand. We see this response as indicative that operators not only want to participate in digital transformation opportunities but enter markets early with the capability to serve them at great scale.

Although these responses describe a transformed telecoms industry in the future, many challenges remain today. We explored these by asking what are the main business service and application challenges respondents' companies must address in 2018? The responses in the chart below show how operators are balancing the demands of digital transformation with the traditional challenges of operational efficiency, profitability, customer experience and infrastructure costs.

What are the main business service and application challenges your company must address in 2018?

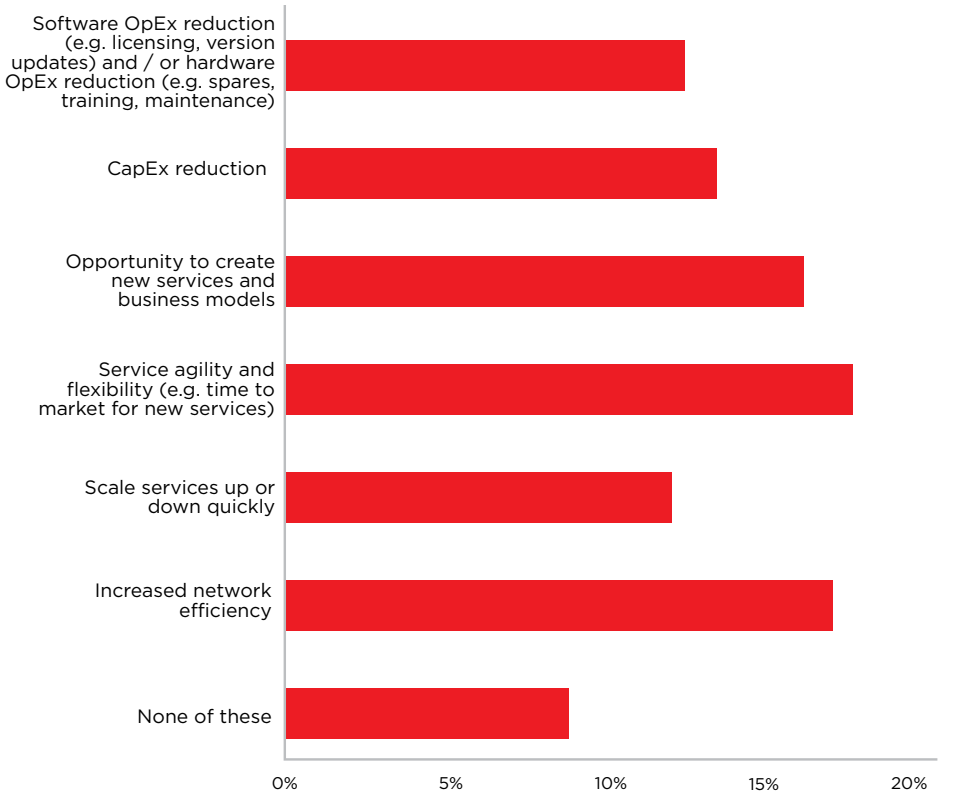


Improving customer experience management (CEM) was selected by the largest proportion of respondents (19.5%) as the main challenge they must address in 2018, which reflects the importance of CEM both in the traditional business as well as in the new opportunities enabled by digital transformation. The chart on the previous page neatly illustrates the divided responsibilities with approximately 40% of responses looking to traditional problems such as infrastructure costs (10.5%), efficiency of operations (16.4%) and profitability (15%) while another 40% are focusing on competition from over-the-top (OTT) services and apps (11%), competition from peer services and applications (10.1%) and time to market for new services and apps (16.4%). The common denominator for both is CEM, which is required in traditional telecoms and in the digitally transformed ecosystem.

Virtualisation

We then examined the drivers for deciding to deploy NFV, asking respondents to select from a list of drivers detailed in the chart below.

What are the most important factors in your company's decision to deploy Network Functions Virtualisation (NFV)?



The most widely selected factor was service agility and flexibility which demonstrates that, while respondents see the advantages in software opex and capex reduction that NFV can bring, they recognise the real prize is in the new service revenues the technology will enable them to generate. We see this as an encouraging set of responses demonstrating that there is both a recognition of the short term cost saving benefits of NFV as well as the longer term and potentially more valuable revenue generation and profitability benefits of the technology.

However, we wanted to look in greater depth at the challenges traditional operators with function-specific hardware face in deploying NFV. To do so we asked how concerned respondents are about technical challenges including packet processing performance in the data plane, the reliability and scalability of commercial off the shelf (COTS) hardware, the operation and back-end integration, troubleshooting and service assurance, cloud orchestration management, managing service failover and recovery, security and vendor solution compliance.

Given the prominence security had in 2017 because of the well-reported attacks on enterprises it comes as little surprise that security was the challenge selected by the largest percentage of respondents (18.9%). However, this neglects to take into account the scale, flexibility and centralised control capabilities of NFV that can enable it to be a more secure environment than a traditional network. While we welcome that attention is being devoted to security, we see a series of other factors presenting significant challenges.

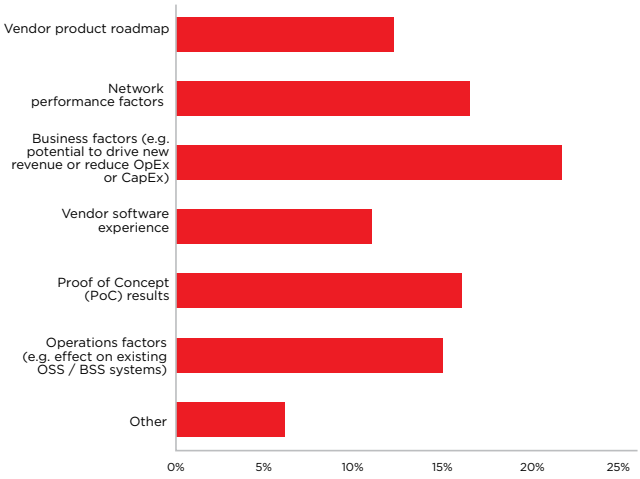
Respondents' concerns about operations and back-end integration, which was selected by 15.5% of respondents, demonstrate growing recognition that new and old technologies will need to co-exist and that the needs and capabilities of new technologies will not necessarily fit with back-end IT. In addition, new skills are required in cloud orchestration and management, which was selected by 13.4% of respondents, revealing awareness that this is a new area and retraining is needed.

To test further respondents' attitudes to virtualisation we next explored which areas they expected their companies to virtualise functions and processes in during the next 12-18 months. This is where the rubber meets the road and talk about future potential is replaced with measurable results. It's clear that respondents are choosing carefully where they make their initial deployments. Some are looking to emerging business areas such as the Internet of Things (IoT), which was selected by the largest proportion of respondents (19.1%). We believe this is because IoT offerings can be provided separately from traditional services, potentially as part of a new unit. This means operators can trial and learn without damaging the core business.

However, others (14.5%) expect to deploy virtualised evolved packet core (vEPC) in the next 12-18 months and a further 16% of respondents expect to virtualise the services and applications layer in the same period. These are critical areas of operator business performance and offer the potential for great operational and capital cost savings to be made. For these operators, the thought process seems to be that the more they deploy the more advantage they can take. We have no visibility into the extent to which these applications will be virtualised nor whether respondents are talking in terms of initial deployments or business-wide rollouts, however, the results demonstrate clear intent to virtualise across the operator business.

Next we examined what operators are prioritising from a list of vendor capabilities, listed in the chart below.

What of the following are the most important factors in prioritising network virtualisation deployment vendors at your company?



Although several technological concerns were listed as priorities including network performance (17.4%) and the operational impact on operations support systems/business support systems (OSS/BSS) (14.9%), it was business factors, such as the ability to drive new revenue or reduce opex or capex, that was selected by the largest proportion (21.4%) of respondents. This demonstrates that virtualisation has to pay its way and vendors need to be able to show how their solutions will achieve the business results that operators need.

We think that the selection of proof of concept results by 16.7% of respondents bears this out because operators want to see proven success before committing investment with a particular vendor. This is also consistent with vendor product roadmap being selected by 12.6% of respondents and vendor software experience being selected by 11.1% of respondents. Customer operators need to feel confident that solutions they invest in will deliver both today and in the future. They recognise this is a new market place and therefore are looking for vendors that can meet their business needs today while also positioning them for the future.

We then turned to look at the new services, applications and offerings that are requiring operators to digitally transform and adopt new technologies. IoT is one that is near the top of operators' lists and we wanted to see how immediate a prospect it is. We asked when respondents expect to see an increase in traffic from IoT and 30.1% of respondents said they were already seeing an increase in traffic. A further 20.4% said they expected to see an increase in the next 12 months, while just over one third (33.7%) said they expect the impact to be felt in the next 12-24 months. Just 15.8% said they did not expect to see an increase in traffic in the next 24 months.

This is positive news for the IoT sector, although it should be noted that many IoT applications have been in operation, generating traffic over operator networks, for several years. It may be the case that the IoT terminology is new but the traffic itself isn't.

5G preparation

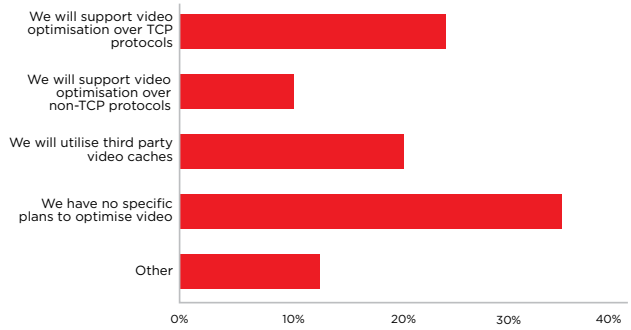
Aside from virtualisation, another big step for network transformation is the introduction of 5G mobile networks. These will offer greater capacity and speeds and enable further mobile services. We asked which 5G capabilities and technologies would support the largest revenue generating opportunities and the greatest proportion of our respondents (21%) selected vertical industry specific application opportunities as the main revenue generating opportunity. The next most popular were more bandwidth, selected by 19.2%, low latency, selected by 16.7% and faster speeds, selected by 15.2%. However, there was some caution with 9.4% of respondents saying they don't know what applications 5G will bring yet and 4% stating that they don't think 5G will bring more revenue opportunities.

We also explored which network capabilities respondents felt their company needs to address before it begins 5G deployment. The most selected response was architecture changes such as mobile edge computing which was chosen by 27.4% of respondents. However, improvement in radio access network (RAN) capacity and latency (18.2%) and service model change to enable support for microservices in the EPC (17.9%) were also selected by substantial percentages of respondents. These responses illustrate the complexity, scale and scope of the 5G preparation task and go some way towards explaining why the expected mainstream deployment of the technology remains years away for most operators.

Big video

Big video is seen as one of the drivers for 5G deployment as users increasingly view even 4k and 8k video over their mobiles. Operators are challenged to support this because, even though 5G can provide adequate capacity and throughput, the monetisation model currently excludes operators. We therefore asked respondents to identify statements that best reflect their company's approach to big video. These are detailed in the chart below.

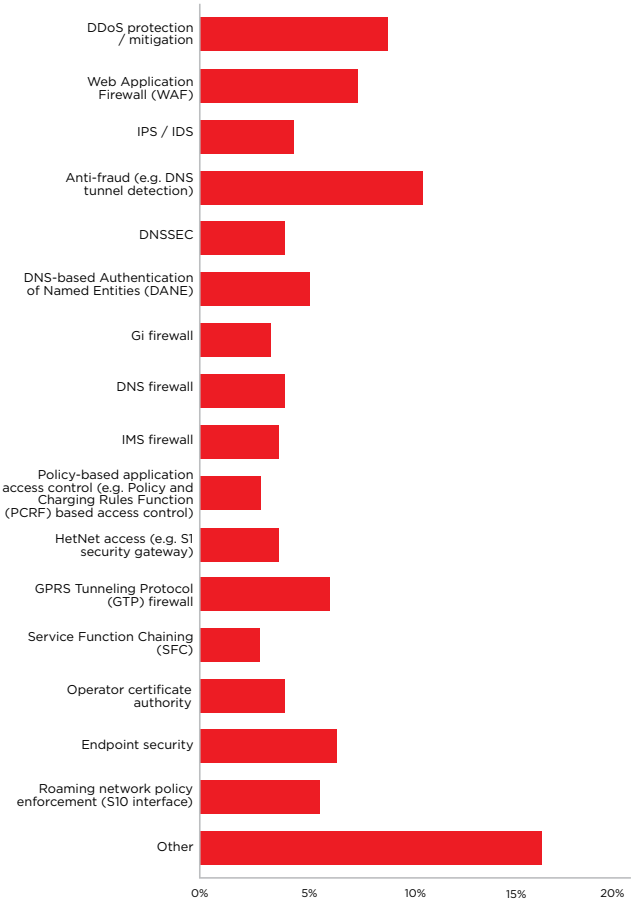
Which statements best reflect your company's approach to video delivery over the next 12 – 18 months?



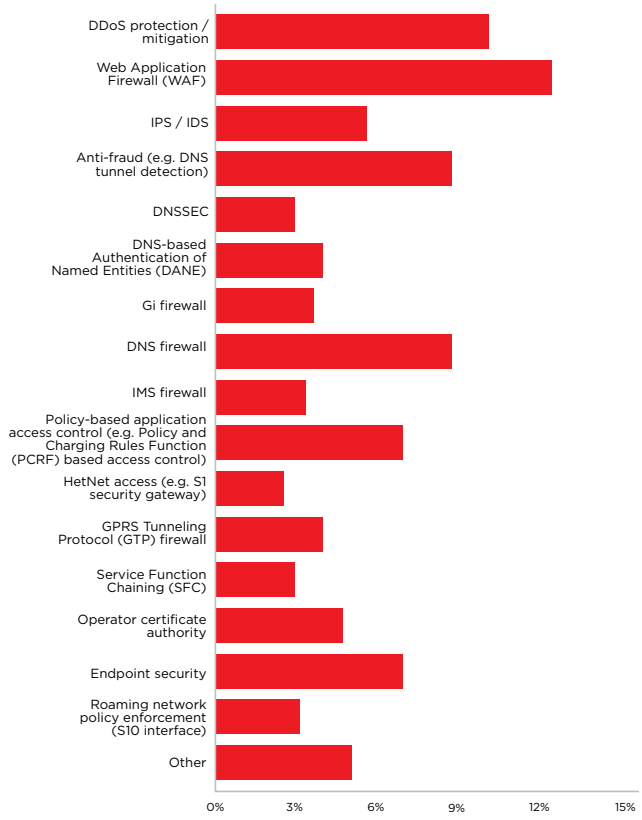
The unclear business model is most likely to be the reason why 34% of our respondents said they had no specific plans to optimise video. While there are several techniques and approaches by which operators could do this, each has a cost in terms of network resources or technology – and often both – to manage the quality of the stream. Operators currently are being cautious because they do not wish to become the de facto providers of ultra-HD video services unless the remuneration model for delivering video changes radically.

Nevertheless, a similar proportion of respondents will support video optimisation. 24.1% said they would do so over transmission control protocols (TCP) and 10.3% said they would over non-TCP, demonstrating that optimised video is being looked upon as table stakes by a third of operators – it's a service they'll have to support with the hope that the business model is sustainable.

Which of the following security capabilities has your company not deployed but will do so in the next 12 - 18 months?



Which of the following security capabilities has your company deployed?



Security

Security has come up several times during the course of this survey. It's an obvious concern for operators and their customers as digital transformation interconnects businesses, operators and end users to a greater extent and breaches can potentially have further reaching effects. To explore this, we asked respondents what is their greatest security concern. The most selected answer was denial of availability, which was chosen by 30.4% of respondents. Next most popular was data theft or exfiltration which was chosen by 28.9%.

This is indicative of widespread awareness of the different types of security threats facing operators and digital transformation in general. To test this awareness, we asked what security capabilities respondents' companies have deployed already, asking them to select all that apply. We then presented them with the same list, but this time asked them to select security capabilities their companies have not yet deployed but will do in the next 12-18 months. The charts on the previous page illustrate the responses received.

It is clear from the responses to the first question that security functionality to prevent distributed denial of service (DDoS) attacks is being deployed and devices such as web application firewalls (WAF) have been rolled out. However, although these tools were most popularly selected, current adoption is at around only 10%. Perhaps of greater concern is that only between 7% and 8% of respondents plan to deploy these technologies in 12-18 months time, suggesting that even routine security is still not having sufficient attention being devoted to it.

These results appear anomalous to the prominence given to security in recent years but could be indicative of the fragmentation of security-related solutions, as evidenced by the length of the list of possible responses. In addition, we consider that the transformation the telecoms industry is going through is making it challenging to invest in specific technologies in the absence of knowing the end state of a new architecture. We take scant comfort from the security abilities of NFV and expect deployment in reality to be faster and more widespread than indicated in the responses to this part of the survey.

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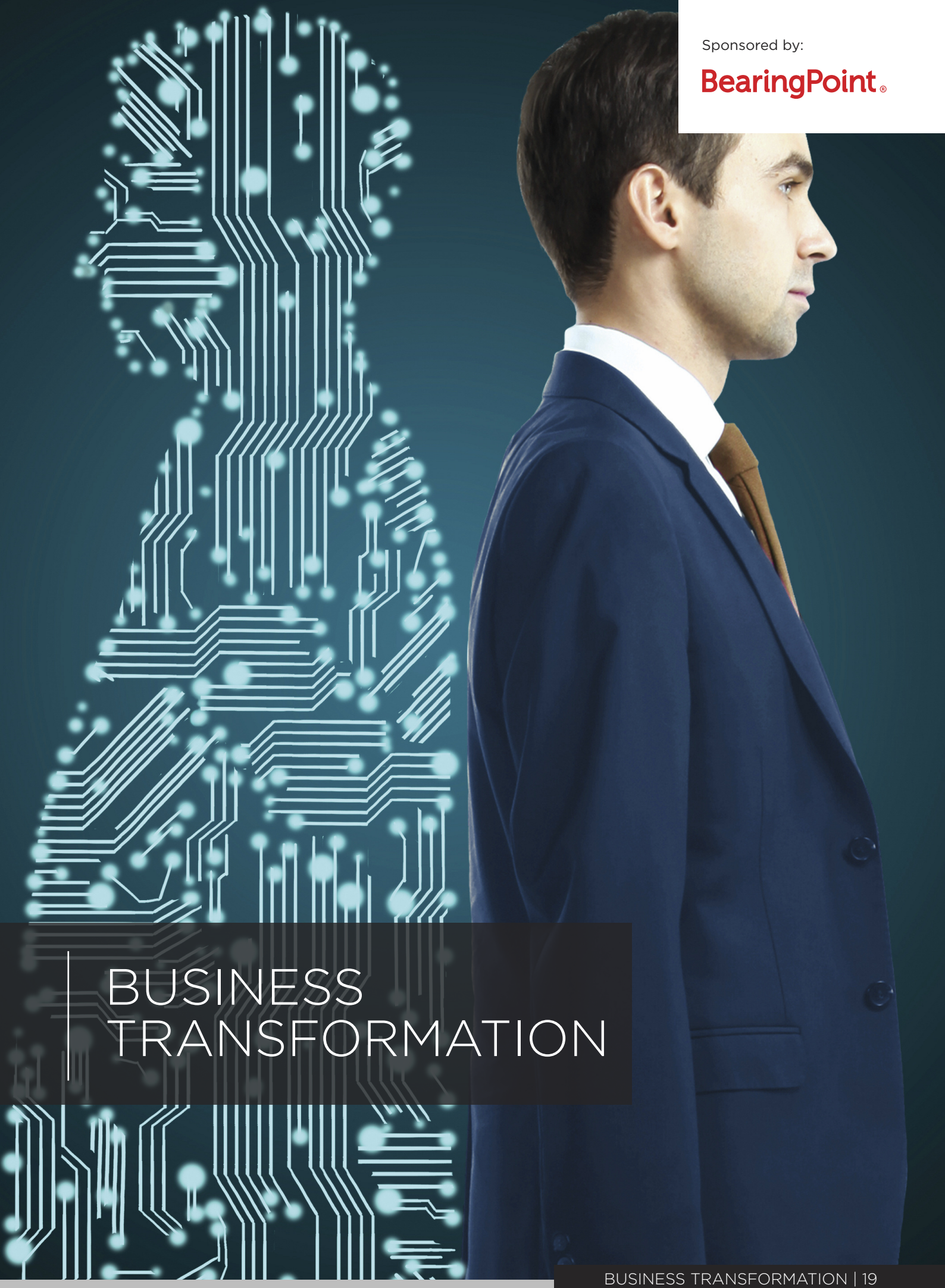


BUSINESS TRANSFORMATION

As digital transformation efforts continue, business transformation is becoming of greater importance and is affected in two dimensions. Digital transformation itself enables businesses to transform whether via servitisation or by harnessing increased automation or to integrate with a wider ecosystem horizontally across multiple verticals. However, for full digital transformation to happen business needs to transform in order to accept and commit to the investments and changes in operations and processes required to fulfil digital transformation.

Organisations therefore have to look both ways – at the end goal of transformed business at the same time as the transformation required of business throughout the digital transformation journey. This starts now if it hasn't already begun. We therefore asked our respondents to indicate how they see digital transformation having an impact on their businesses.

Mobile operators clearly welcome the opportunity that digital transformation provides to redefine their businesses, with 60.3% stating that it provides a chance for them to completely reinvent the telecoms business. The positive attitude continued among a more cautious 27% of respondents who said that operators will generate some new revenues in specific application areas, demonstrating confidence among almost 90% of respondents that mobile operators will accrue benefits from digital transformation.

However, 8% of respondents had concerns that operators would remain confined to being providers of connectivity, even though their networks enable digital transformation. A further 4.6% said they thought digital transformation is overhyped and will only have a small impact on operators' revenues.

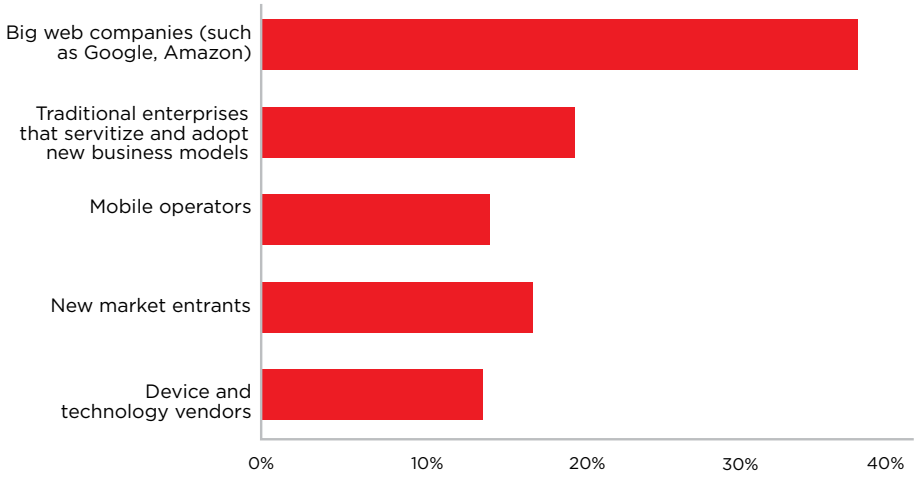
The large proportion of respondents that see digital transformation as an opportunity demonstrate a widespread understanding of the scale and scope of the new opportunities it will enable. However, we wanted to understand more about how operators see themselves in the digital value chain. We asked whether respondents thought mobile operators are well placed to enable digital transformation business models for other organisations and 62% said they felt mobile operators are natural partners for other organisations.

Yet, the remaining 38% felt that operators would not be able to transform themselves quickly enough to enable the digital transformation business models of others. That's a stark warning for the mobile industry. It seems apparent that operators have substantial value to add and revenue to generate as a result of digital transformation but there's a danger that delay could mean missing out on the opportunities, as has been seen in the past with various forms of mobile content and social media.

We explored this further by asking who will gain the most from digital transformation and uncovered a more pessimistic view of mobile operators' prospects. 38.5% of respondents felt that big web companies such as Google or Amazon had the most to gain, while traditional enterprises that servitise and adopt new business models, selected by 19.5% of respondents, would be the next greatest gainers.

Mobile operators came in as the fourth most widely selected category to gain, garnering a 13.2% share of respondents, significantly falling behind new market entrants (16%) and only narrowly exceeding device and technology vendors (12.6%).

Who will gain the most from digital transformation?

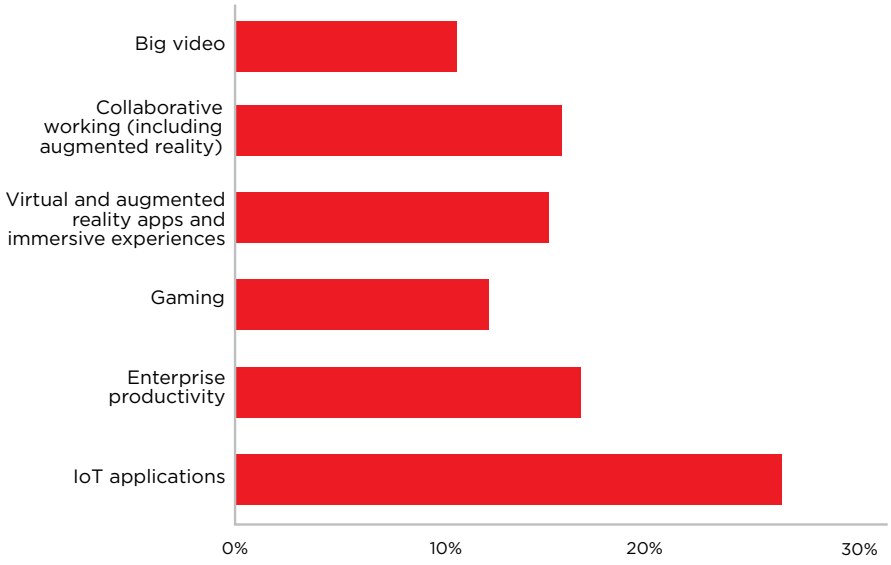


Next, we moved on to examine the ways in which operators could generate new revenues in a digitally transformed world. First, we asked whether operators' access to big data and their analytics capabilities will be made available to partners and monetised effectively. Broadly, this was seen as a substantial and attractive opportunity with 39.9% of respondents stating that operators' insights are valuable and they will be able to market them effectively. A similar proportion of respondents – 36.4% – were more cautious but still identified a significant opportunity, stating that some insights will be sold successfully.

15.6% of respondents felt that selling of data and insights won't happen because of privacy concerns and laws while 8% said they didn't think operators would be able to present useful insights to third parties effectively. These objections can potentially be handled if operators tread carefully and ensure their offerings are secure and comply with regulations. However, for the technical objection to be overcome operators will have to better address the ways in which they mine, analyse and present data. After all, if they are to sell this as a service, they will have to provide it in an accessible and valuable way.

Next, we asked which new applications will be driven by digital transformation and enabled by operators' networks. We asked respondents to select from the categories listed in the chart below.

Which new applications will be driven by digital transformation and enabled by operators' networks?



The Internet of Things (IoT) is gathering momentum in advance of digital transformation and is a constituent part of business transformation initiatives. It also is reliant on connectivity, although that is not necessarily provided by mobile operators. IoT was therefore unsurprisingly selected by 26.3% of respondents. Closely-related, the next most widely selected application group was enterprise productivity apps, which was followed by collaborative working including augmented reality (AR). Both of these have the potential to deliver high rates of investment return for customers because of their capability to deliver productivity uplifts that far outstrip the often relatively costly deployment of enabling technologies and systems.

We then looked at the ways in which operators will be remunerated for providing connectivity. We asked whether respondents expect connectivity to be sponsored by non-operator application, service and content providers. Unsurprisingly the largest proportion – 58.1% – of respondents said that this would be dependent on the type of service being provided but 25.3% said they did expect connectivity to be sponsored. 16.7% said it would not be sponsored.

Delving deeper into this subject, we asked whether respondents expect connectivity to be subsidised for some apps and services. 69.5% of respondents said they did, while 30.5% did not.

We believe that mobile operators should take encouragement from these responses as they try to define business models that support sustained investment in networks to support the massive increase in bandwidth demand the new applications we have explored will create.

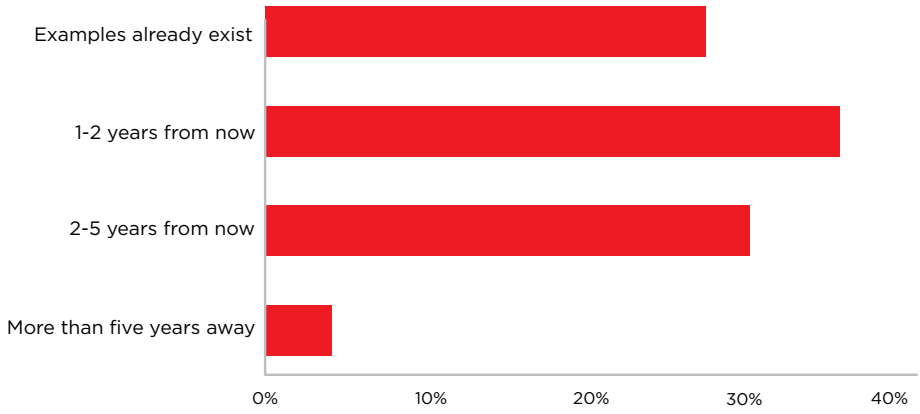
However, it's clear that the traditional model of the operator providing connectivity and this being paid for on a one-to-one basis is drawing to a close. Digital transformation creates a complex ecosystem in which different organisations will co-operate and compete at different times and in different situations. Sometimes they will share revenue among partners, sometimes they will be the vendors of services and sometimes they will be customers.

The multi-directional, multi-faceted digital ecosystem will require companies that are able to take on board the nuances of these new relationships and perform a trusted role of apportioning revenue and responsibilities. Mobile operators see potential in that role for themselves and we wanted to explore how they see themselves. To achieve this, we asked whether operators would be able to transform their business models to accommodate multi-party business models.

32.2% of respondents said they believe that operators are the natural managers of complex ecosystems of partners and 54.6% said they think operators will play some part in linking different players. However, 13.2% felt that operators will be confined to the role of connectivity providers to the digital ecosystem.

New models are still evidently under development so no responses are set in stone. However, in planning any strategy a timeline is vital because being early or late can equate to being wrong. We therefore asked how far away respondents think new models enabled by digital transformation are.

How far away do you think new models enabled by digital transformation are?



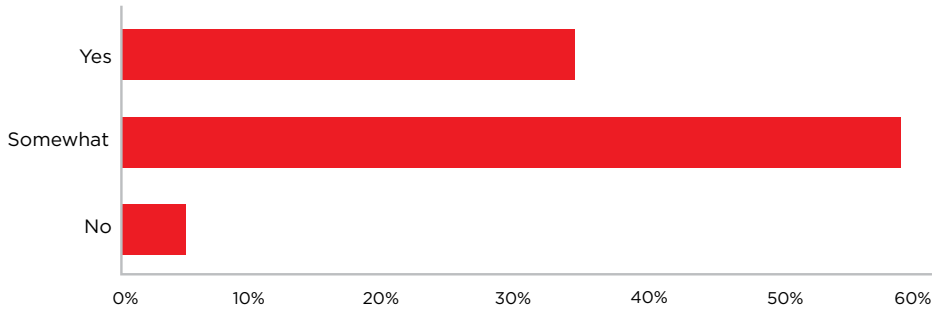
28.3% of respondents said that examples of new models already exist, while 37% said new models are only one to two years away. We believe these respondents are looking to early examples that are already in the market place in which operators are working with partners to deliver services. There are already strong examples in IoT of operators supporting providers of heavy equipment monitoring or for fleet management and these represent the early wave of pioneering deployments.

However, a further 30.6% felt that the new models would arrive between two to five years from now. We believe this segment of respondents is looking to see more mainstream deployments at far larger scale and part of the delay is caused by waiting for mass market economies of scale to emerge as technologies mature and are deployed in volume. A pessimistic 4% of respondents felt the timescale would be longer than five years, perhaps because of the complexity involved in developing new supply chains and harnessing the automation, artificial intelligence and machine learning necessary to run complex systems at great scale, while keeping the operational costs sustainable.

Finally, we asked respondents if they think that digital transformation will enable operators to reset their cost bases and offset the commoditisation of connectivity. This is the fundamental motivation for operators to transform. They're being asked to deploy greater and greater amounts of capacity that can deliver high speed and low latency and serve the needs of digital transformation. However, they're being asked to make these investments in the face of declining service revenues and a saturated market place where there are few, if any, greenfield customers to generate growth from. The traditional telecoms market has become ultra-competitive and, in order to sustain increased network capacity investment, operators need to tap into new sources of revenue and transform their balance sheet.

This, to a great extent, explains operators' enthusiasm for digital transformation – it could be the rescuer of the telecoms industry. Our respondents therefore displayed a blend of hope, enthusiasm and caution in their responses, as detailed in the table below.

Will digital transformation enable operators to reset their cost bases and offset commoditisation of connectivity?



The enthusiastic, those who responded yes, accounted for 35.4% of respondents. The hopeful, those who said somewhat, are the largest proportion of respondents and expect that digital transformation will somewhat enable operators to reset their costs bases and offset the commoditisation of connectivity. The final group are highly cautious, those who said no, and do not think digital transformation will change operators' cost bases. The encouraging news here is that this group accounts for only 5.1% of respondents.

The clear signal we take from the responses to this section of the survey is that operators have clearly identified the business transformation required for them to carve out a substantial role in the digitally transformed economy. They also recognise the need for speed and will draw on the lessons of past failures to ensure they succeed with digital transformation. After all, as was reported at the beginning of this section, 60.3% of respondents have identified that digital transformation provides them with an opportunity to completely reinvent the telecoms business.

OPERATIONAL TRANSFORMATION

Much of this survey has focused on the technical transformations that are needed to enable digital transformation but the software and hardware – whether virtual or physical – is only part of the enablement equation. Operators must also transform their operations, shifting their skills bases into new areas and altering the company culture even further away from their recent heritage of being network operators. Radio and core network engineers still have vital roles to play but these are changing and need to be augmented with IT awareness to enable engineers to operate virtual infrastructure effectively as well as to engage with increasingly prevalent automation.

To explore the extent to which respondents think relevant expertise is available we asked whether they feel there are enough people with the right skills for digital transformation available in the market place. The responses revealed a clear skills shortage with 64.5% stating that there are not enough people with the right skills available. Just 35.5% felt there was a sufficient amount of digital transformation expertise available, demonstrating that substantial retraining and upskilling is required for the digitally transformed world.

We did, however, expect this level of response so our next question was designed to gauge which skills are in shortest supply but also to try and identify how far away from the right skillset existing operator employees are. We think that many of operators' existing employees have many of the skills needed for digital transformation but perhaps not all of them. The training burden may therefore be smaller than expected.

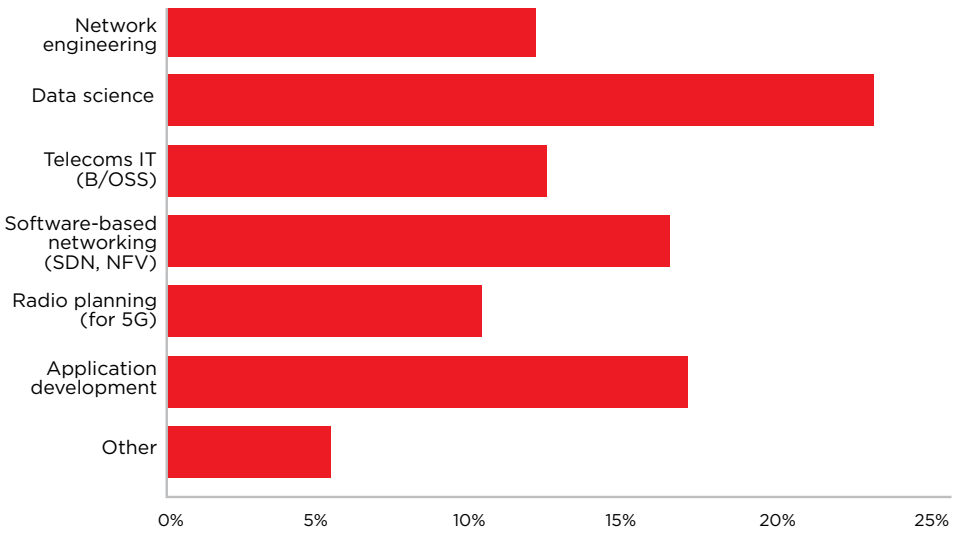
We believe also that networking skills will remain of great significance as network engineering expertise starts to need to express itself more in IT terms than in traditional networking vocabulary. The network expertise remains fundamental, it is simply taking a different shape which current network engineers can readily understand and learn rapidly.

The results unsurprisingly revealed a large proportion of respondents selected software-based networking skills – predominately in SDN and NFV – as being in short supply. These were identified as lacking by 17.1% of respondents. However, traditional telecoms skills were also identified with 12.4% of respondents stating that network engineering skills are in shortest supply, 13.3% selecting telecoms IT and 10.7% choosing radio planning for 5G skills as in shortest supply.

It was the emerging skills of application development and data science that were most widely selected, though. 23.3% of respondents said data science skills were in shortest supply while 17.6% of respondents felt application development skills were scarcest. These shortages are to be expected as organisations – not just operators – are all ramping up their digital activities with the emphasis on data analytics and development of new services and applications.

We were moderately surprised that telecoms IT skills were selected by such a large proportion of respondents (13.3%) because we had assumed that current operations staff were in abundance at the majority of operators. However, it appears that respondents feel some retraining and adoption of new capabilities is needed and this is being characterised as a skills shortage. The next question amplified this conclusion.

Which of the skills necessary for digital transformation are in shortest supply?



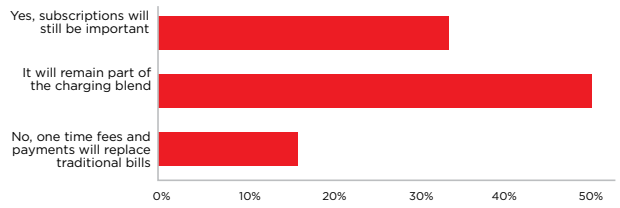
We asked whether current back office systems can be repurposed to support new services. 28.3% said that they could while 14.5% said they could not. However, the largest proportion of respondents by far, 57.2%, said some systems will continue to work well in support of digital transformation enabled services. This illustrates that at least some existing telecoms IT skills will remain useful but some retraining is needed and this perhaps explains why a telecoms IT skills shortage was identified by more than a tenth of respondents.

Billing is one of the attributes that operators can bring to digital transformation. They have the capability to handle charging, bill presentment and collection and, in general, they are trusted by customers to collect money and bill accurately. However, digital transformation may result in a changed billing relationship and we wanted to explore this in detail. We therefore asked respondents whether traditional billing will still have a role after digital transformation.

The largest proportion of respondents (50.6%) said they believed that traditional billing would still remain part of the charging blend after digital transformation, illustrating that, while subscriptions for basic connectivity services may remain, users will increasingly adopt other means to pay for their digital services. This was borne out by the 15.7% of respondents who stated that one-time fees and payments will replace traditional bills. However, there is still widespread belief that subscriptions will remain important even post digital transformation, as a third of respondents (33.7%) said.

The shift in billing emphasis has its roots in the changed service profile offered by operators. Instead of offering metered services based on monthly consumption of utility-like infrastructure, operators will increasingly be the providers of many different types of often low-value, high-volume services. We therefore asked whether operators would be able to support large volumes of microservices, all of which need to be configured, operationalised, assured, charged for and, ultimately, retired.

Will traditional billing still have a role after digital transformation?



The largest proportion of respondents (42.9%) said that they believed operators will be able to support large volumes of microservices because new systems will enable them to launch new services rapidly and at massive scale. This illustrates a reliance on the software vendor community to bring new systems to market to enable them to do this. In some cases, these may actually be upgrades to existing systems that essentially enable them to be repurposed for the digital era.

However, another large proportion (32.5%) of respondents stated that operators' IT constraints would be a bottleneck that could hinder them in their support of large volumes of microservices. In the digitally transformed world any bottleneck decelerates the market place and is unacceptable so operators will have to move swiftly in upgrading their IT to ensure this is not the cause of them being too slow to take advantage of all the digital transformation opportunities open to them.

Of more concern is the still large proportion of respondents (24.5%) who thought that other organisations than operators will be the enablers of microservices. If this is to be the case, operators will not be significant participants in the business of microservices, they will merely be connectivity providers.

Yet operators are set to play a substantial enabling role in the provision of microservices. If they open their application programme interfaces (APIs) to third party developers, they will enable operator functions, notably connectivity, to be incorporated with apps and microservices. There is potential for this to be monetised because of the inherent value of operator APIs. However, in the past, operators have jealously guarded their APIs in the belief that they give them substantial competitive advantage.

Digital transformation means that game is changing and operators are increasingly regarding their APIs as important tools for developing the wider digital ecosystem and putting them at the heart of it. To explore this changed attitude to opening APIs we asked our respondents whether operators would open their APIs to enable new services to be introduced over their networks by third parties.

A large majority (82.3%) of respondents thought that operators would do so, most likely for the reasons outlined above – there is revenue to be shared from doing so and operators can also generate revenue from other services they can provide to third parties.

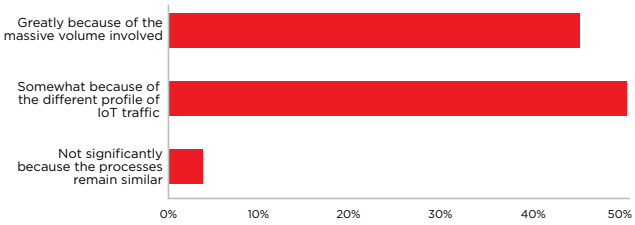
The minority (17.7%) felt that operators would not open their APIs to third parties. This suggests there a significant proportion of respondents that still feel keeping APIs closed protects the operator's business from competition such as that from over-the-top (OTT) providers.

If opening APIs is a change that could enable the business models of third parties, the introduction of the Internet of Things (IoT) represents a new market in which operators can play a central role by providing connectivity plus additional services. However, this is not a clear-cut winning chance for operators. IoT services do not necessarily need operator-provided forms of connectivity. Other low power or even satellite bearers can be utilised.

In addition, the IoT business substantially differs from traditional telecoms traffic. Sensors in their tens of thousands may send only small amounts of data each month, while other IoT devices, probably in lower volumes, may continually stream high definition video. The market characteristics are therefore wide and varied. A common thread, though, is that billions of devices are expected to be connected, far outstripping the number of humans in the near future.

We wanted to explore how operators are preparing to support IoT so we asked our respondents to what extent they see the demands of IoT necessitating operational transformation?

To what extent do the demands of IoT necessitate operational transformation?



Encouragingly for operators, the largest proportion of respondents (50.3%) said they thought operations would need to be transformed somewhat because of the different profile of IoT traffic outlined above. However, more respondents (46%) thought greater transformation was needed stating that operational transformation is required to a great extent because of the massive volumes involved in IoT. This finding is consistent with projections for IoT deployment which will see many millions of devices deployed over the next few years, many of which will be relatively low value in comparison to human consumers. Operators will have to redefine how they service these devices because the margins will be thin. For example, truck roll to service an IoT connection would wipe out profitability from the device for a period of many years.

It is clear that there is widespread understanding of the scalability challenges of IoT as just 3.7% of respondents felt the demands of IoT would not significantly necessitate operational transformation because the processes remain the same. It is true that the process of distributing, configuring, connecting, monitoring and charging for devices are similar to traditional telecoms but the revenue and the volumes involved are wildly different.

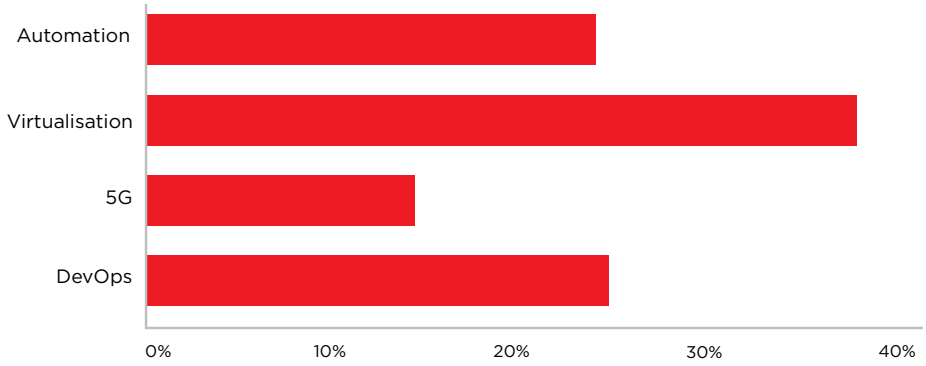
We then turned to assess whether operators will be able to change. Operators have a long heritage of providing carrier-grade, high availability services for which they charge a premium. This reflects the years of careful trials and research which go into bringing an operator service to market. However, to compete in the digitally transformed world, their service introduction cycle will have to accelerate to match those of web companies. We therefore asked whether operators will be able to move from their carrier grade heritage to the fast deployment model of large web companies.

The largest proportion of respondents (59.9%) felt that they would be able to do so. Perhaps this confidence is based on the fact that the imperative to change in this way is abundantly apparent. Put simply, if operators want to have a future that extends beyond providing connectivity, they have to change their service deployment model.

However, the remaining 40.1% felt operators would not be able to change and adopt the practices of web companies. It's not a natural thing for an operator to launch beta versions of new offerings and do its testing in the market place but this is what web companies do routinely and users are now familiar and expect this. Potentially, we expect this to usher in a two-speed telecoms business. This will involve high quality connectivity with five-nines or more reliability continuing to be provided to customers who expect it and are happy to pay for it while new services are provided on the web model. These customers will recognise the services are still being developed but understand this thanks to their experiences with the offerings of web companies.

Taking into account that there are many different dynamics within the concept of digital transformation we concluded this section of our survey by asking respondents what they see as the greatest cultural shift for operators out of automation, virtualisation, 5G and DevOps.

What do you see as the greatest cultural shift for operators?



The largest proportion of respondents (38.2%) selected virtualisation perhaps because efforts are underway and the extent of the change necessary is becoming increasingly apparent. Next most widely selected was DevOps, which was chosen by 24.9% of respondents. The concept of DevOps is clearly at odds with the traditional operator practice of developing each phase of a service to its completion before moving to the next and then going through extensive testing. It's therefore apparent that DevOps disrupts the traditional development cycle as well as radically accelerating new service introduction time. This has a knock-on effect on marketing, support and customer experience management. The speed for some will be the greatest cultural shift experienced.

We were somewhat surprised that automation was selected by 24.2% of respondents as the greatest cultural shift. This may be because automation efforts remain at a relatively early stage or it may be that respondents feel they are familiar with the concept of automating traditionally manual tasks and therefore find it less of a cultural shift.

5G unsurprisingly was the least widely selected category and was chosen by 12.7% of respondents. Although the technology is markedly different to the previous mobile generations, it is in some respects an upgrade to LTE. Besides, operators have routinely introduced new generations of mobile technology each decade, so the introduction of another radio technology is not seen by many as the greatest cultural shift affecting operators.

EXPERIENCE TRANSFORMATION

Aside from increased profitability and productivity, one of the main goals of digital transformation is to provide enhanced experiences for users – consumer or professional. 2018 will see a coming together of several different technologies and concepts that enable and support digital transformation and, ultimately, rich and new user experiences. These extend from new network technologies such as 5G mobile and network functions virtualisation to new concepts such as Internet of Things and servitisation and, cutting across and through both, new technologies such as augmented reality, virtual reality, artificial intelligence, and machine and deep learning.

All of these are innovative, transformative and pioneering and, excitingly, are maturing into the market place during the same five year window which opens in 2018. The experience users will receive in 2025 will be a giant step beyond what we know today and the step is likely to be far greater than that experienced with the introduction of IP technology for the fixed internet in the late 1990s or the arrival of smartphones over a decade ago.

We wanted to understand our respondents' perceptions of which technologies will transform the user experience as part of digital transformation so we started this section of our survey by asking them which technologies would impact the user experience the most. Artificial intelligence (AI) was selected by the greatest proportion of respondents (41.7%), far outstripping the other technology options we offered. Next most widely chosen was Internet of Things (IoT), which 24.4% of respondents selected.

Respondents still recognise the importance of the network to connect these technologies and deliver attractive experiences to users so it was somewhat surprising that only 17.9% of users selected 5G. Perhaps the market place is so used to the mobile industry stepping up network performance every generation that it's seen as more of a formality than an innovation. However, the complexity of getting 5G to work and the value of the experiences it will provide should not be underestimated.

Nevertheless, with futuristic demos of augmented and virtual reality already widespread, it's no surprise that these are on respondents' radars as they assess how to turn cool tech into monetisable, appealing, user experiences. These technologies attracted 8.9% and 7.1% of our respondents respectively, demonstrating that while it's early days for them, our respondents are keeping a close watch on their development and see them as revolutionary.

Amidst all the innovation, we wanted to assess the likely role of operators as the providers of digital experiences, so we asked whether they will be recognised as such. Encouragingly, 65.9% of our respondents said mobile operators would be recognised as the providers and enablers of digital experiences. However just over a third of respondents thought they would not, perhaps echoing fears that operators simply aren't able to transform rapidly enough to achieve the status of digital enablers at the centre of the digital experience.

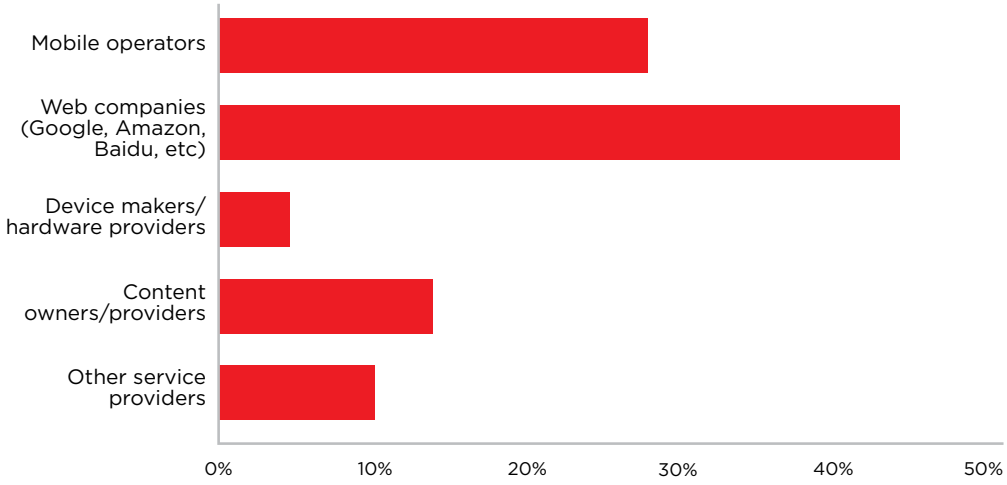
"Encouragingly, 65.9% of our respondents said mobile operators would be recognised as the providers and enablers of digital experiences."

One of the concerns often stated about the digitally-transformed market place is that support will not be readily available. Operators have substantial concerns about this because, almost uniquely, they are the ones with call centres, helplines and customer service representatives. We therefore asked which organisations users will turn to for support for their digital services.

Unsurprisingly mobile operators were chosen by 27.9% of our respondents, most likely for the reasons outlined in the previous paragraph. However, 43.5% of respondents said web companies such as Google, Amazon or Baidu would be the organisations users turned to. This may be demonstrative of the fact that support in the digital world won't be the same as traditional call centre led support. The automation inherent to the digital market will be replicated in support structures and users will happily use self-care and automated support to solve their issues. This is something web companies are experienced at and able to do at great scale. Operators may not find having a call centre a differentiator, nor a means to generate revenue by providing its capabilities to partners.

Content owners were seen as the organisations users will turn to for support by 14.3% of respondents while device makers and other service providers accounted for the balance of responses.

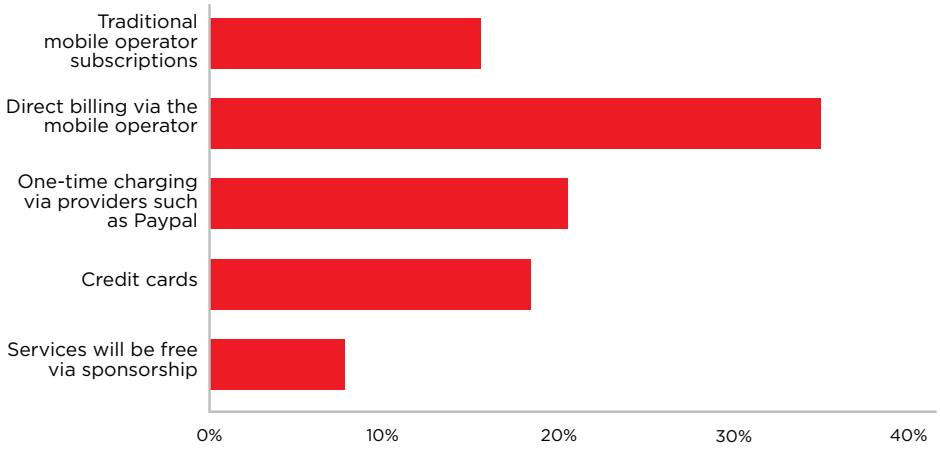
Which organisations will users turn to for support for their digital services?



Another traditional operator strength that is applicable to the digitally transformed world is their capability to bill, charge and collect payments for services. The only other organisations that can do this at such great scale are credit card or online payment providers and those typically offer no further granularity of information into volumes consumed or elements of a service that are being charged for.

This capability may become relevant but it is likely that as traditional businesses servitise they will adopt monthly fee models for services provided that will more closely resemble vehicle leasing models than the metered charging of the old telecoms era. We wanted to examine how respondents think users will pay for their digital experiences and asked them to select from the options in the chart below.

How will users pay for their digital experiences?



As many will have expected, both one-time charging via providers such as Paypal, selected by 20.6% of respondents, and credit cards, chosen by 19.4% of respondents, were selected by a greater proportion of respondents than traditional mobile operator subscriptions, which were selected by 16.4% of respondents. However, this doesn't give the whole picture. The largest proportion of respondents (35.1%) thought that direct billing via the mobile operator will be the way in which users pay for their digital experiences.

The mobile phone still has many advantages and users are increasingly familiar with using it to pay for items that are not related to their telecoms usage. In addition, mobile devices are typically always present where their owners are making them a convenient payment method for the future. Finally, mobile operators are highly trusted by their customers so they are a natural provider of payment services if they can continue to assure users of their security and data protection capability.

Naturally, in any survey, there are outliers and for this question we suggested that payments won't be necessary because services will be free via sponsorship. 8.5% of respondents thought this would be the case, perhaps revealing that this percentage of the base are looking to lower value services that can be readily subsidised. In any emerging situation it's clear there will be extremes. While viewing a music video may be sponsored by an advertising brand, driving a new car for half a day from a car club probably won't – unless the car maker is trying to market that type of car to the user.

Nevertheless, it is clear that many mainstream, routine activities could readily be sponsored either in the form of requiring advertising to be viewed or in the form of making their personal data available to marketers. This could extend from location based data to enable city planning or planning the location of new physical stores or it could be more about internet usage habits. To examine this, we asked whether respondents would be willing to share personal data about service and network consumption if they were compensated through service subsidy or sponsorship.

There was a near-even split between those who said yes and those who said no, both being chosen by approximately 20% of respondents. Perhaps more significant was the majority of respondents (58.9%) who said they would only share specific data in exchange for specific benefits.

In our view this does not reveal an excessively cautious attitude to sharing data but, instead, an attitude that personal data is valuable and the exchange needs to be valuable and fair. Users will allow their data to be shared if, for example, they are given free mobile data allowances but probably won't share data if they're offered a small sample of a product they're not very interested in. The telecoms industry is not the only one with a lot of learning to do; digital marketers are entering a new and complex field of personal preferences and tastes in which it will be very easy to alienate users and very hard to secure continuous buy-in to sharing data.

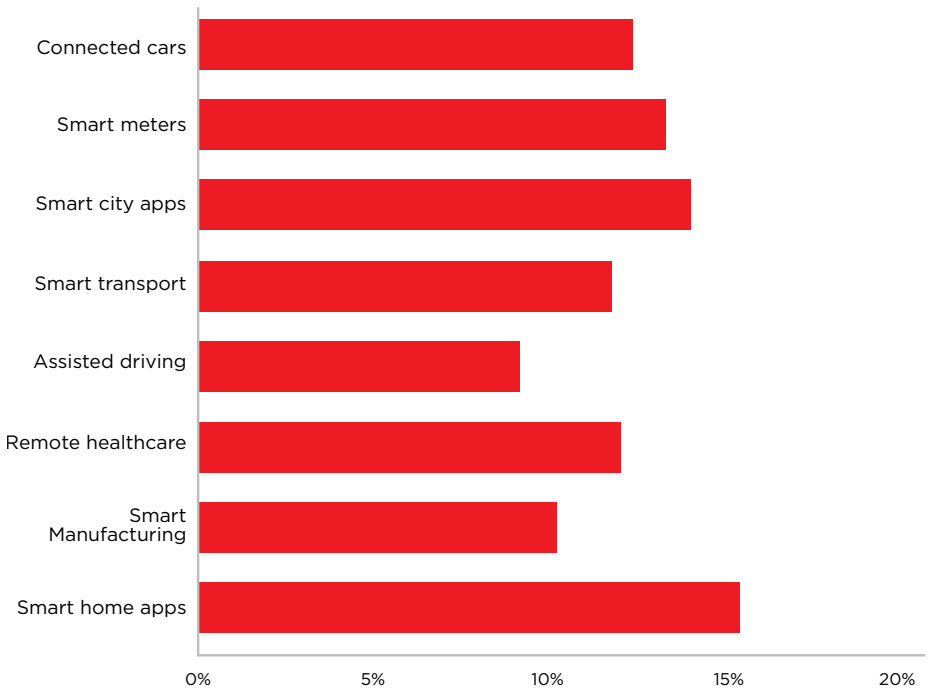
We then turned the survey to technology to assess respondents' expectations of when new innovations will become available and how they will transform the digital experience. First, we asked how soon respondents say augmented and virtual reality (AR and VR) will become widely available to consumers.

This very much depends on individual definitions of widely available and it is true that elements of AR and VR are present in products available from retailers today. This is most likely to be behind the selection of 2018 by 9.6% of respondents. Similarly, at the other extreme, respondents may be thinking of widely available as meaning a majority of vehicles are driven using AR or VR and that is why a quarter of respondents (25.8%) said they think these technologies will be available later than 2020.

What is interesting is that a majority of respondents – almost 65% – expect the technologies to become widely available in either 2019 (28.1%) or 2020 (36.5%). The future really is almost here.

The next technology we looked at was IoT. We asked which applications respondents thought would be available in their markets by 2022. That's a comparatively distant window but for IoT to truly reach its potential substantial infrastructure – in terms of network and devices – needs to be in place and that will necessitate a significant period of time. The results are in the chart below but it is interesting to note the generally even spread of responses, with home, city, utilities and connected car applications garnering the largest proportions of respondent selections.

What Internet of Things applications do you think will be available in your market by 2022?



Finally, from a technology point of view we asked respondents how willing they are to use tools such as chatbots enabled by artificial intelligence (AI) to manage their services and digital lives. The surprise was that 41.7% of respondents said they were only willing to do so for a small set of applications and 5.95% said they were not willing to do so at all. This indicates greater reliance on traditional means of managing services and potentially a mistrust of AI. There remains plenty of time for the technology to be explained properly but these responses demonstrate that there is a significant proportion of people for whom something being new is not enough – it must also clearly be better and safer than what has gone before.

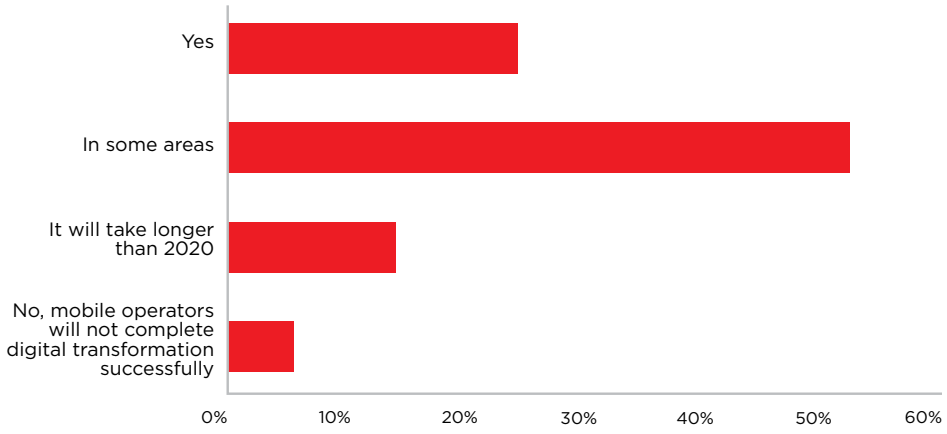
The flip side of this coin is that more than half of respondents were fully engaged with chatbots enabled by AI. 23.8% of our respondents said they were very willing to use them for most applications and a further 28.6% were willing to do so for most applications.

We then moved on to ask respondents what they see as the timescale for experiencing the benefits of digital transformation in their user experience. Encouragingly, the timescale selected by most is relatively short with 45.2% stating they expect to see the fruits of digital transformation before 2020. Others (44%) were a little more cautious, stating that the fruits would become apparent between 2020 and 2022.

A small proportion (10.8%) felt it would take a while longer for the benefits of digital transformation to feed through to the user experience and said they expect this to happen later than 2022.

Given the large proportion that either expect to be enjoying the benefits of digital transformation or at least utilising many digital transformation enabled technologies and services by 2020, our last question was both an appropriate way to conclude this section and the entire survey. We asked if respondents would consider their mobile operator a digital services provider by 2020.

Will you consider your mobile operator a digital services provider by 2020?



As the chart above illustrates, mobile operators can take great encouragement from the fact that just 6.55% of respondents think they will not be able to complete digital transformation successfully.

However, the news is not all good. Although 25% of respondents stated their mobile operator will be considered to be a digital service provider by 2020, the largest proportion of respondents (53%) said this would only be the case in some areas. A more pessimistic group – totalling 15.5% of respondents - said that it would take longer than 2020 for them to view their mobile operator as a digital service provider.

The finding then is that most respondents believe mobile operators can successfully transform into digital service providers but see the complexity and scale of the task. The positive takeaway is that even though the expectation is that operators will need to take some time to transform successfully, they will do so. In short, for operators, there is still all to play for in digital transformation. The priority should be to accelerate and foster momentum through 2018 and into 2019 as new technologies and services go mainstream.

Sponsor's Comment: Amdocs

CLOSING SUMMARY

It is clear that service providers are acutely aware of the need to enhance their business models in the new digital economy. But it is also interesting to consider the massive catalyst for transformation that will be driven by upcoming 5G network rollouts.

5G networks will serve as the backbone for a new generation of services that require the higher bandwidth, lower latency and greater agility these networks have to offer. This new wave of advanced digital experiences and services will have the power to transform our day-to-day lives in ways that are even more impactful than the digital transformation we are seeing today.

However, the focus for 5G must inevitably turn from how we deploy these networks to how we monetize them. 5G services and the associated network slicing will change the way service providers monetize network and data access, and the value they offer partners in the digital ecosystem.

Though the survey indicated that 5G is currently out of scope for 40% of service providers, a large percentage – 30.5% – were establishing strategy and examining use cases, and nearly 20% were performing proof of concepts. So the industry is gearing up for 5G, and it is important that we begin thinking how 5G will serve to further transform the digital ecosystem and service providers' place in it.

In order to ensure that Amdocs is ready to help our customers monetize the 5G opportunity, we have developed the industry's first 5G-ready online charging system as part of our digital monetization solution. This solution enables the monetization of all product configurations that are made possible by the 5G ecosystem and 5G network slicing. Our customers are at the forefront of 5G development and Amdocs is right there with them to help them transform their business.

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