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# Introduction

**Published By:**

KNect365 TMT  
Maple House  
149 Tottenham Court Road  
London W1T 7AD  
Tel: +44 (0) 20 7017 5000  
Website: www.digitaltveurope.com

**Editor** Stuart Thomson

Tel: +44 (0) 20 7017 5314  
Email: stuart.thomson@knect365.com

**Contributing Editor** Andy McDonald

Tel: +44 (0) 20 7017 5293  
Email: andrew.mcdonald@knect365.com

**Commercial Director** Patricia Arescy

Tel: +44 (0) 20 7017 5320  
Email: patricia.arescy@knect365.com

**Art Director** Matthew Humberstone

**Marketing Manager** Marita Eleftheriadou

**Printing** Wyndeham Grange, West Sussex

**KNect365**  
TMT

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## Behind the screen



Digital TV Europe's third annual survey reveals what top industry executives think about the most pressing issues facing the digital video distribution business. This year, the central focus is on the impact of cloud technology and the challenges facing pay TV operators in the face of ongoing fragmentation of the business and the emergence of major internet players.

Over 500 industry executives from 56 countries responded to our call to share their views on a range of seven topic areas this year. In addition to summarising and analysing views on the overall digital TV landscape, including prospects for pay TV and the forces driving change, we drilled down into six other areas: cloud technology and the economics of video; OTT TV distribution; the live-streaming revolution; the cloud, data and security; the multiscreen video experience; and multiscreen distribution and service provider WiFi.

The overarching theme is the growing importance of cloud technology, not only in shaping the services that are delivered to end consumers but in determining the choices pay TV operators and others make in building and maintaining their networks.

First, service providers are increasingly using cloud-based infrastructure to deliver their offerings to consumers. Second, the application of cloud technology is spurring the launch of more OTT TV services, still primarily for on-demand content but increasingly also for live and linear services.

The growth of live-streaming is a specific topic in this year's survey. We examine the use of OTT to provide coverage of live events, driven by the ongoing explosion in mobile video consumption.

The expansion in the use of cloud technology is also related to a growing need on the part of video service providers for data. In this year's survey we look closely at the importance of data analytics and the security of personal data.

We examine the opportunities and challenges faced by service providers as they address the growing need to deliver video to multiple screens. Related to this, we also look at the challenges faced by service providers to cater to the use of multiple devices to consume video in the home.

The survey results, presented in full, offer a wealth of data about how industry leaders view the challenges and opportunities across a range of key topics.

Stuart Thomson, editor

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# The digital TV landscape

## Introduction

The big story in digital video distribution over the last year has been the relentless advance of the cloud. The perception that the cloud is the most efficient way to deliver video services has gained fresh adherents and reinforced the convictions of those that had already moved to adopt cloud-based technology.

In *Digital TV Europe's* third annual survey, we asked our readers to give their views on different applications of cloud technology that are impacting both the kinds of functionality being enjoyed by consumers and the underlying platforms that determine the speed with which new services can be launched and their economic viability.

Aspects considered are the evolving economics of video distribution, trends in OTT TV distribution, live-streaming, data and security, multiscreen delivery and the new requirements for in-home distribution of video.

To kick off, however, we asked our survey respondents to assess the prospects for the future of pay TV and some of the forces driving change.

The results confirm there is a growing perception that the pace of change is accelerating, and that established media players must act quickly if they are going to continue to meet the evolving needs of consumers.



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# The digital TV landscape

## Prospects for pay TV

The last year appears to have seen an increase in pessimism about the future of pay TV. While many respondents still believe that pay TV is set for growth, the proportion that believes pay TV is set for modest or zero growth globally over the next couple of years, and the number that believes pay TV will enter a decline, have increased.

Only one in 10 respondents now believe that pay TV will see rapid growth over the next few years, despite the room for expansion of the TV subscriber base that exists in emerging markets and the more aggressive marketing of multi-play offers in mature markets.

A more substantial group – representing close to two in five of respondents – believe that pay TV will see modest growth, boosted by emerging markets and multi-play bundling, but with some negative impact from OTT TV competition and erosion of the prices operators can charge for services.

The proportion of survey respondents that believe pay TV faces bleak prospects has risen, however. Some 36% of respondents to this year's survey believe pay TV will see very modest or zero growth globally, with a strong competitive impact from OTT TV as well as the price erosion that can come from competition generally.

Some 14.4% now believe that pay TV will see negative growth globally, with OTT TV competition and price erosion taking a more impactful toll. (Fig.1).

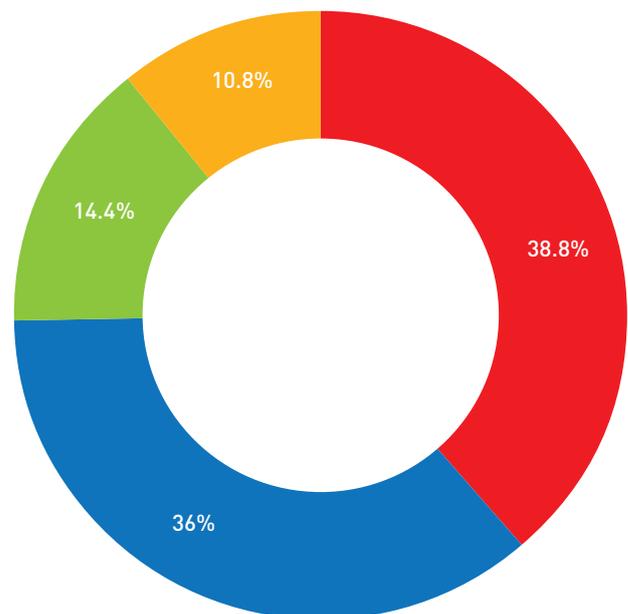
We asked survey respondents to compare the growth prospects for pay TV operators, free-to-air broadcasters, subscription video-on-demand service providers, other – transactional – VOD providers and multi-play service providers that bundle TV with fixed and mobile broadband and telephony.

SVOD is the clear winner in the minds of survey respondents. Almost half of all respondents said that SVOD players – such as Netflix and Amazon Prime Video – had very positive growth prospects, with a further 36.7% saying they had moderately positive prospects. By contrast, fewer than one in 10 respondents believe pay TV service providers have very positive prospects. Even though just under half of respondents believe pay TV has moderately positive prospects, over 41% believe pay TV operators have either moderately negative or very negative prospects. Fewer than 15% think the same for SVOD players.

In fact, in the comparison question, pay TV services are perceived to have the worst prospects of all types of service considered, behind not only SVOD but also transactional VOD providers and even old-fashioned advertising-supported free-to-air broadcasters.

There is however a silver lining to the cloud hanging over pay TV. Service providers are perceived to have much stronger prospects when they bundle TV offerings with fixed and mobile broadband and voice. Respondents believe that multi-play providers have strong growth prospects, with four in five respondents believing that multi-play providers have either very positive or moderately positive growth prospects, taking them to second place behind SVOD providers in the list. (Fig.2)

**Fig. 1** Which of the following statements best expresses your opinion about the prospects for pay TV services globally over the next two years?



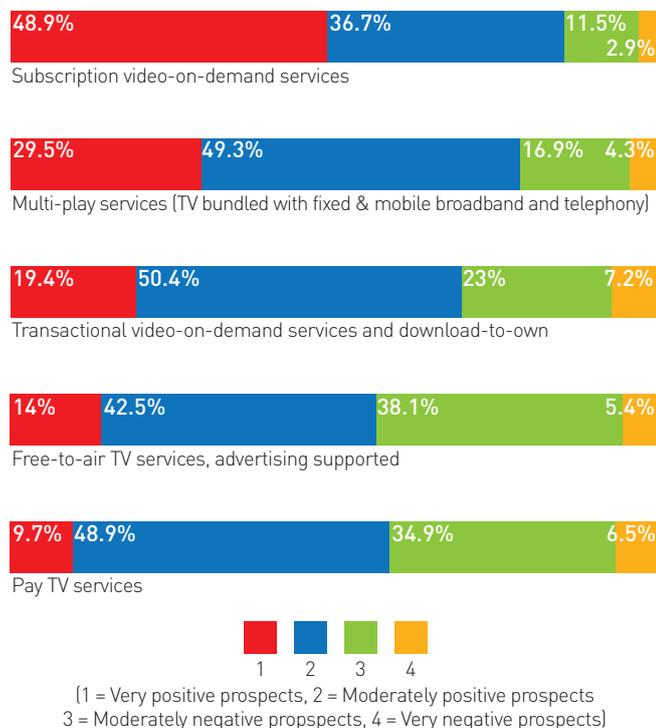
- Pay TV will see modest growth, boosted by emerging markets and multi-play bundling, with some negative impact from OTT TV
- Pay TV will see very modest or zero growth globally, with a strong competitive impact from OTT TV services and price erosion
- Pay TV will see negative growth globally, with a critical competitive impact from OTT TV services and price erosion
- Pay TV will see rapid growth driven by emerging markets growth and multi-play bundling, and will see little negative impact from OTT TV or price erosion

## Forces driving change

For survey respondents, the technology factor driving change is first and foremost the use of cloud technology.

Asked to rate a series of developments likely to have an impact on the value of the global digital TV business over the next two years, respondents placed the growing use of cloud infrastructure to replace legacy broadcast technology at the top of the list. Some two in five respondents said the cloud would have a strong positive impact on the value of the business, with a further 42.8% saying it would have a moderate positive impact.

**Fig. 2** How would you rate the future growth prospects of the following types of service?



Other factors considered likely to have a positive impact – all of which achieved broadly similar scores – include the growing use of mobile screens to view content in place of the TV screen, the growing use of data analytics and the challenge of protecting personal data, growing demand for multi-play bundles – the saving grace for infrastructure-based pay TV operators – and growing demand for flexibility in the way TV services are packaged and a move away from long-term contracts – a countervailing trend that reflects the weakening grip of pay TV providers on their base.

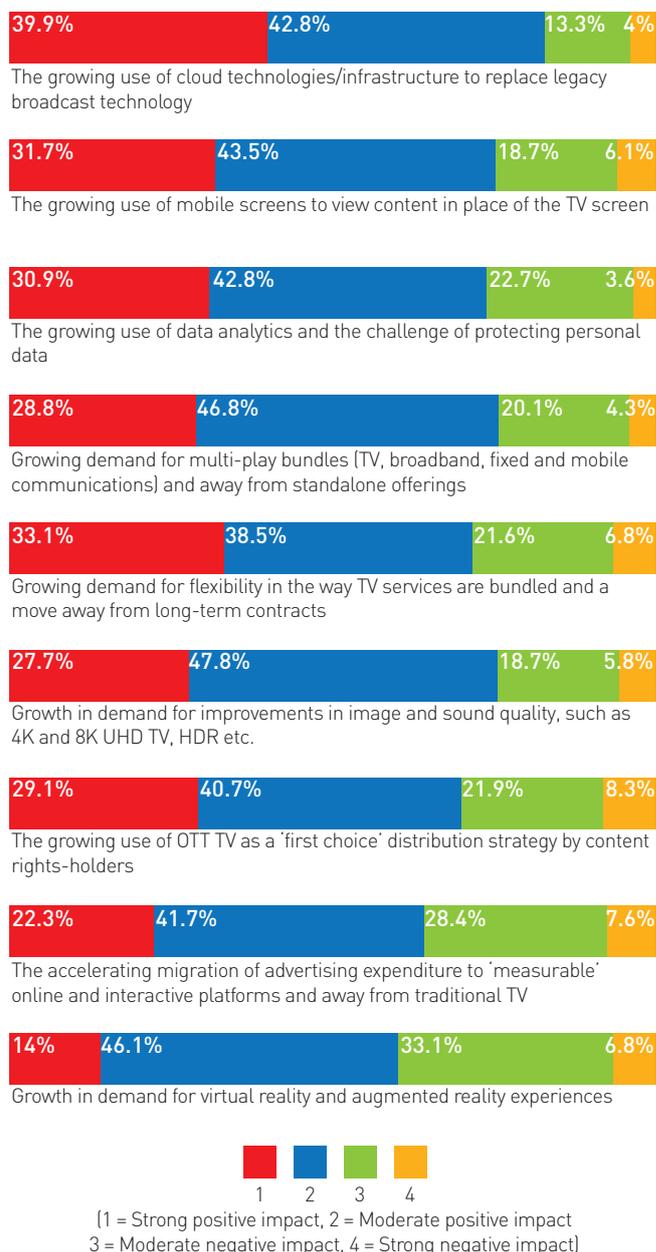
Respondents are slightly more cautious about hailing the growing use of OTT TV as a ‘first choice’ distribution strategy for rights-holders, although over 30% believe this will have a strong positive impact on the business. They are more cautious still about welcoming the accelerating migration of advertising expenditure to measurable online and interactive platforms and away from traditional TV. The number of respondents that see this as having a negative impact is greater than those who see it as having a strong positive impact. (Fig. 3)

There has been much debate around the entry of internet giants into the video space and their potential to seriously disrupt the digital video distribution business.

Recently, social media companies including Facebook and Snapchat have focused on video to fuel the next phase of their development.

In the view of survey respondents, however, Netflix remains the company that has most influenced the shape of the industry. Asked

**Fig. 3** Which of the following developments will have a big impact on the value of the global digital TV business over the next two years

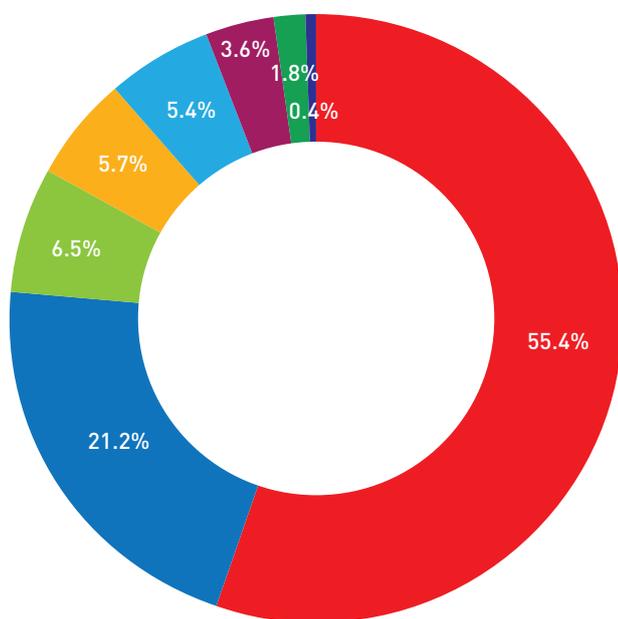


to identify the company or group of companies that had the biggest impact on digital video distribution over the last year, 55.4% of respondents chose Netflix. Amazon, Netflix’s closest direct competitor, came a distant second, identified as having the biggest impact by 21.2%. Of the other players, pay TV operators considered collectively came third, chosen as having the biggest impact by 6.5%. Of the other

digital players, Google was the most significant, attracting 5.7% of votes, followed by Facebook with 5.4%.

Traditional big media groups and studios such as Disney and Discovery collectively attracted only 3.6% of votes. Apple secured only 1.8% of votes, while Twitter and Snapchat barely registered. (Fig. 4)

**Fig. 4** Which of the following companies do you think has had the biggest impact on the business of digital video distribution over the past year?



- Netflix
- Amazon
- Pay TV operators collectively (Sky, Comcast, Liberty Global, Canal+, Deutsche Telekom, Telefónica etc.)
- Google
- Facebook
- Big media companies/studios collectively (Disney, Discovery etc.)
- Apple
- Twitter

## Conclusion

Survey respondents are now deeply pessimistic about the future growth prospects of traditional pay TV businesses.

A substantial number of respondents now believe that pay TV will see modest or zero growth over the next few years. The number of people that believe pay TV players is negative growth is now greater than the number that believe pay TV will see rapid growth.

However, while the prospects for pure-play pay TV are not good, according to our survey sample, things improve if operators can bundle pay TV with other services such as broadband. Multi-play providers continue to have strong growth prospects, according to respondents.

The big winners from the changes taking place in video consumption habits are, however, subscription video demand players. Survey respondents believe that SVOD players have the strongest growth prospects among all types of media company.

The company driving this perception is Netflix. Survey respondents believe Netflix had the biggest impact on the digital video distribution business last year, well ahead of its closest competitor, Amazon.

Changes in consumption habits and the technology that facilitates service delivery are continuing to change the nature of the media game. Cloud-delivered disruptors such as SVOD players are seen as having much stronger prospects for growth than established media companies with well-proven business models.

The cloud is a key enabler of this change. Respondents to our survey rate the growing use of cloud technology as the most important development that will have a strong positive impact on the global digital TV business in the near future. ●

# Cloud technology and the economics of video

## Introduction

The application of cloud technology to video processing and delivery is already having a major impact on the economics of running video services. Shared infrastructure provides economies of scale and greater flexibility, as well as enabling smaller providers more easily to tap into the benefits of technological innovation.

At the level of consumer-facing services, cloud technology is playing a crucial role in decoupling video services from specific end-user devices and enabling a true device-agnostic experience – something that is clearly appreciated by respondents to our survey.

It is in the field of video processing, however, that the cloud is likely to have the biggest impact of all.

The benefits of scale and access to new innovation provided by the application of cloud technology will enable new and existing video service providers to launch new offerings quickly and with less risk.

It will also liberate service providers from worrying about technology, enabling them to focus on building, packaging and marketing new and exciting offerings.



AWS Elemental is an Amazon Web Services company that combines deep video expertise with the power and scale of the cloud to provide nimble, flexible software-based video processing and delivery solutions. With AWS Elemental, customers can harness the elasticity of the cloud when needed, on demand and with pay as you go services.

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# Cloud technology and the economics of video

## The impact of cloud technology

The adoption of cloud technology is set to have a major impact on the economics of launching and running video services. Cloud-based platforms are already being used to deliver the services of multiple video providers, and the pace of migration is accelerating.

Asked about the likely impact of cloud technology on video services, over seven in 10 of our survey respondents agree that cloud technology is having a transformative impact on all or some aspects of launching and running video services. Some 30.9% of respondents say it will have a transformative impact on all aspects of video service provision. A further 39.2% say it will have a transformative impact on some, but not all, aspects of delivering video.

Only a minority of respondents feels that cloud's impact will fall short of justifying the 'transformative' label. Some 16.9% believe that the cloud will nevertheless have a significant impact on all aspects of launching and running a video service – albeit one that falls short of deserving the 'transformative' description. A further 11.2% of respondents believe that the cloud will have a significant – but not transformative – impact on some, but not all, aspects of launching and running services.

Only a tiny minority – 1.8% – of respondents believes the cloud will have a small or negligible impact overall. (Fig. 5)

We also asked survey respondents which parts of the content creation and delivery chain, and consumer applications, would see the greatest impact or benefit from cloud technology.

The application of cloud technology to TV everywhere services will see the biggest impact, in the view of our sample. Some 55.4% of respondents believe that cloud technology will have a very big impact on TV everywhere services, with a further 32.7% believing it will have a moderately significant impact on TV everywhere.

Survey respondents give a similar score for the impact of the cloud on video-on-demand services: 54.7% believe the impact of cloud technology on the way VOD is delivered will be very significant, while 32.4% believe the impact will be moderately significant.

Also likely to see a major impact from the cloud is targeted advertising. Over a third of respondents believe the cloud will have a very significant impact here, with a further 41.4% believing it will have a moderate impact.

Applications that will see a moderate impact from the adoption of cloud technology include the consumer-facing applications of startover/pause live TV and digital video recording (DVR).

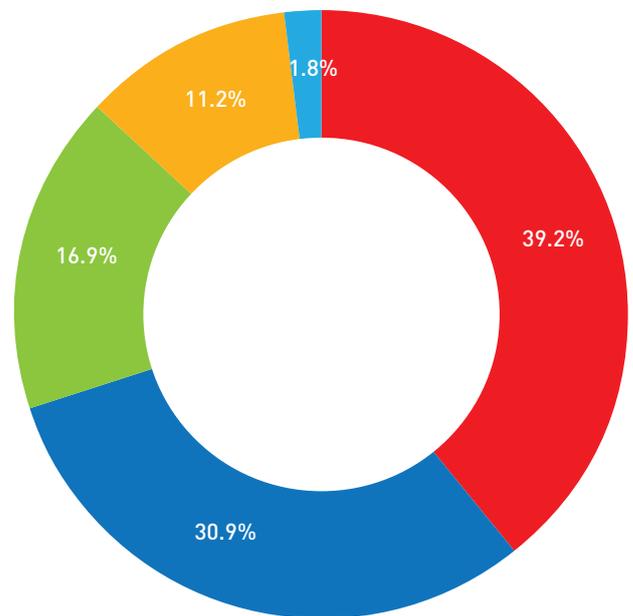
**40%** think cloud technology will have a transformative impact

Over seven in 10 respondents believe the cloud will have a very significant or moderately significant impact on startover/pause live TV, while 64% believe the same for DVR.

DVR is often seen as an obvious candidate for the application of cloud technology. However, some 36% of respondents believe the impact of the cloud on DVR will not be very significant or will be negligible. This may be related to residual concerns about regulatory and legal hurdles – notably the difficulty in a number of jurisdictions of implementing the shared-copy model – or to the perception that DVR itself is being superseded by VOD.

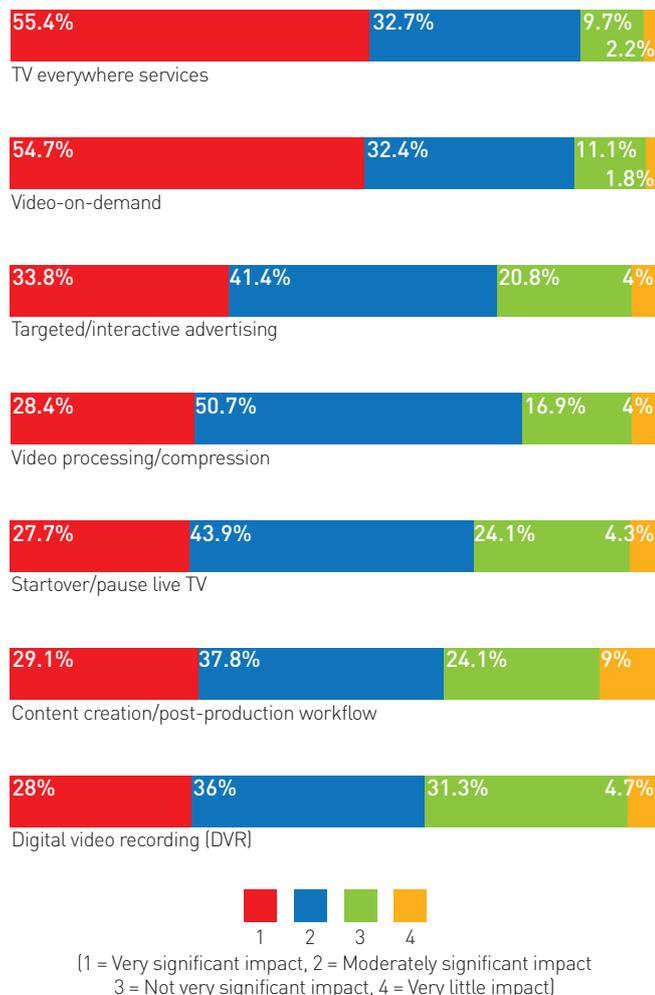
While consumer-facing cloud applications grab most of the attention, almost 80% of respondents also believe that the cloud will have either

**Fig. 5** Which of the following statements best expresses your view of the impact of cloud technology on the economics of launching and running video services?



- Cloud technology will have a transformative impact on some but not all aspects of launching and running video services
- Cloud technology will have a transformative impact on all aspects of launching and running video services
- Cloud technology will have a significant but not transformative impact on all aspects of launching and running video services
- Cloud technology will have a significant impact on some but not all aspects of launching and running video services
- Cloud technology will have only a modest impact on launching and running video services

**Fig. 6** Which parts of the content creation/delivery chain and consumer applications will see the greatest impact/benefit from cloud technology?



a very significant or a moderate impact on video processing/compression functions, with 28.4% believing it will have a very significant impact. (Fig.6)

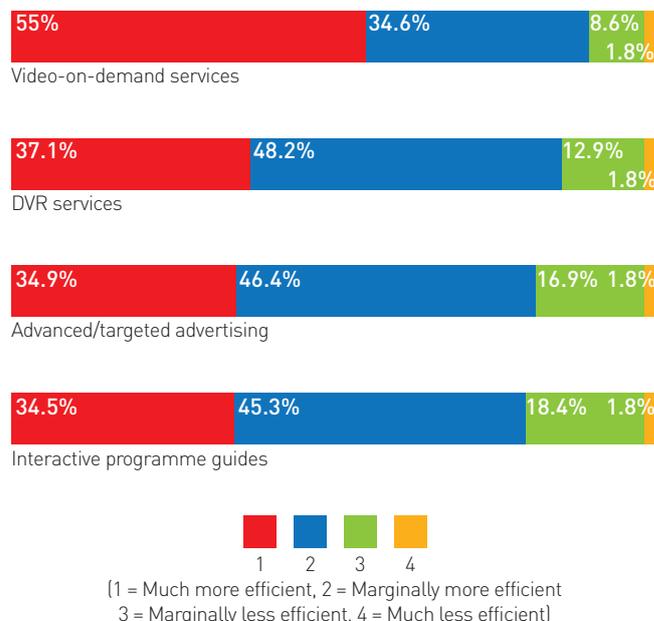
We also asked survey respondents to express a view on how efficient public cloud technology will be in delivering consumer-facing applications compared with legacy technology.

Some 55% of respondents believe that public cloud-based video-on-demand services are more efficient than legacy technology with a further 34.6% believing it to be marginally more efficient, making this the top rated application of those considered for the perceived efficiency gain of migrating to the cloud.

Some 37% of respondents think that public cloud-based digital video recording (DVR) services are much more efficient than those delivered via set-top boxes, with 48% believing cloud-based services to be marginally more efficient.

Just over a third of respondents believe that interactive programme guides and targeted advertising respectively are much

**Fig. 7** How efficient do you think it would be to use cloud technology to provide the following services compared with legacy technology?



more efficiently delivered from the cloud, with a higher proportion believing them to be marginally more efficiently delivered from the cloud. (Fig.7)

All of these findings are reflected in perceptions about who stands to benefit most from the use of cloud technology.

We asked our survey sample to express an opinion about where service providers stand to benefit most from the application of the technology. Unsurprisingly the delivery of TV everywhere services stands at the top of the list of areas where service providers are likely to benefit most, with almost half of respondents believing the cloud will deliver a very significant benefit here and a further 38.9% believing it will provide a moderately significant benefit.

Video-on-demand follows hard on the heels of TV everywhere in this list, with cloud technology providing a very significant benefit to operators, in the view of 48.6% of respondents.

The application of cloud technology to content recommendation and personalisation also provides big benefits to service providers in the view of respondents, with 42.5% expressing the view that it provides a very significant benefit.

Recommendation and personalisation is followed by video processing/headend functions. In this area, a third of respondents believe operators will see a very significant benefit from the application of cloud technology, and 45% believe they will see a moderate benefit.

Other consumer-facing areas where operators are expected to see a significant benefit are DVR applications including pausing live TV, and the user interface/programme guide.

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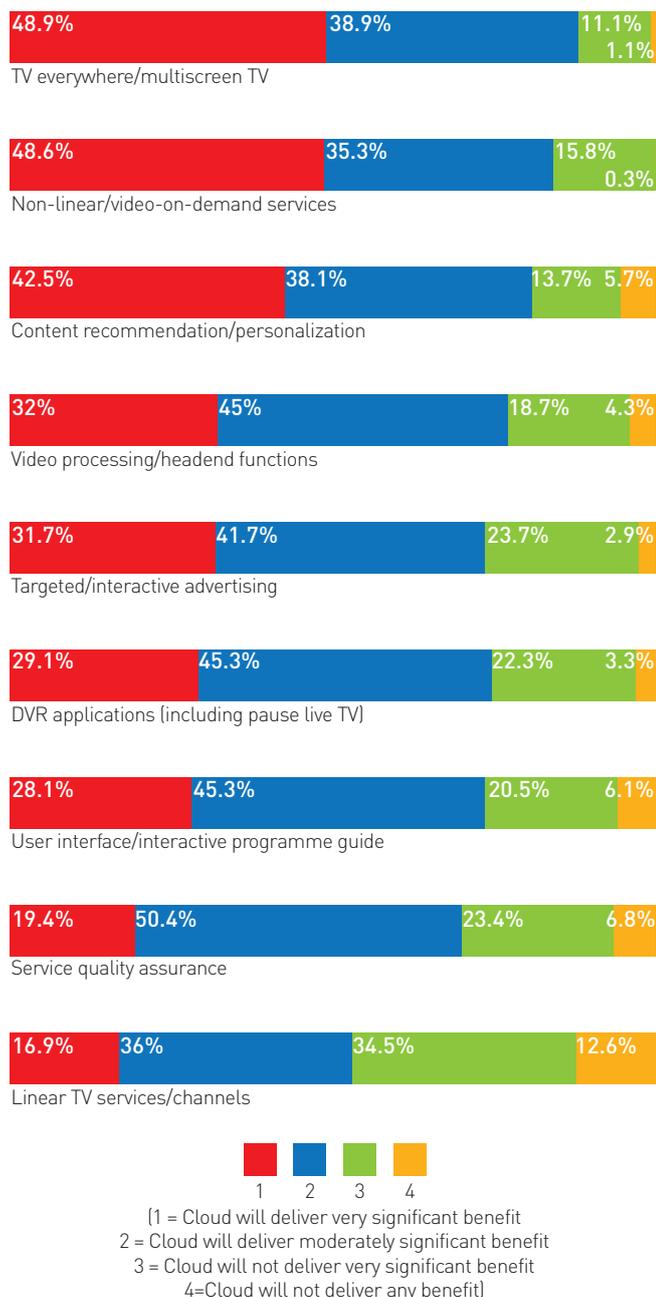
AWS Elemental  
MediaStore



AWS Elemental  
MediaTailor

Areas where the benefit of cloud technology is likely only to be moderate include service quality assurance and, trailing at the rear, –the delivery of linear TV channels. (Fig.8)

**Fig. 8** In which of the following areas do you think service providers stand to benefit most from the use of cloud technology?



## Video processing: weighing the benefits

Our survey respondents clearly appreciate the importance of cloud technology to video processing/compression.

Drilling down into perceptions about the principal advantages of applying cloud technology to video processing, our respondents rate scale and the ability to launch services without big upfront investments most highly.

Some 52.5% of respondents say that resources being scaled infinitely according to demand for a service is a very important advantage, with a further 42.1% rating this as moderately important.

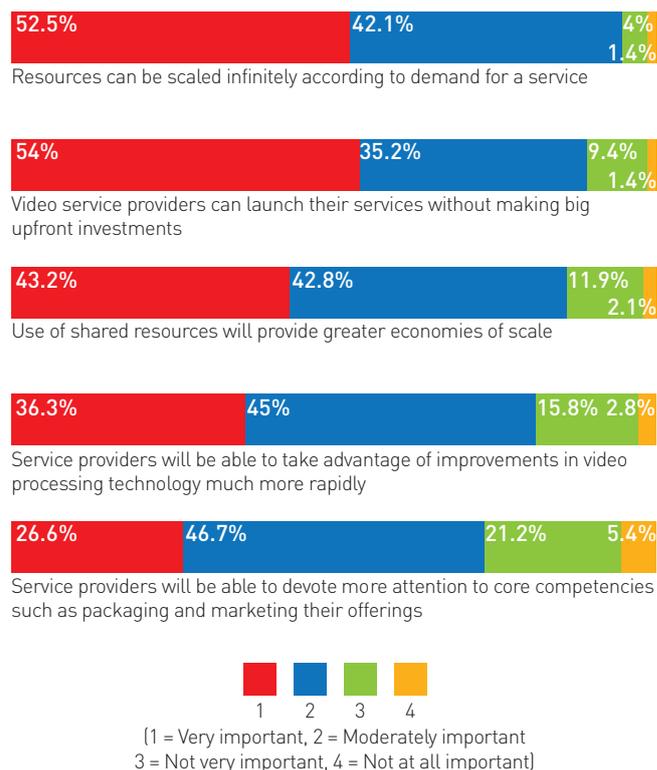
Some 54% of respondents also rate the ability of video service providers to launch services without big upfront investments as very important, with a further 35.2% rating it as moderately important.

Also rated highly is the ability of service providers to use shared resources to provide greater economies of scale, with 43.2% rating this as very important and 42.8% rating it as moderately important.

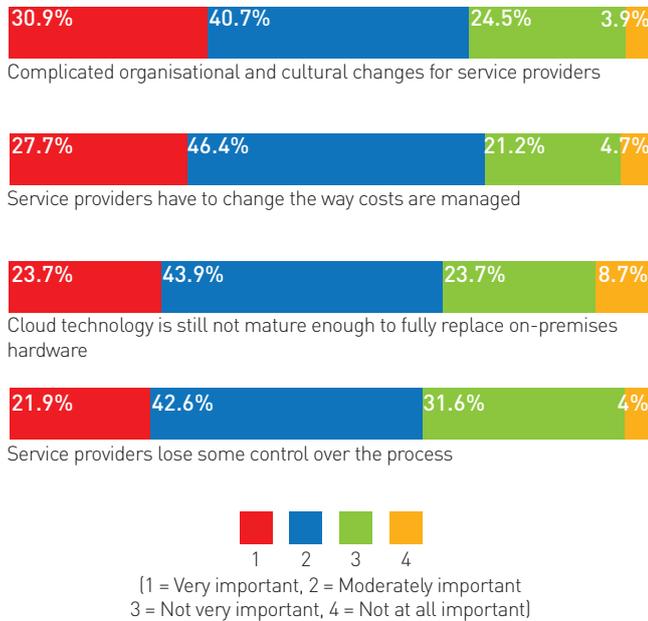
Other merits of adopting cloud processing include the fact that service providers will be able to take advantage of improvements in video processing technology much more rapidly than if they are left to invest in their own equipment.

Of somewhat less importance in relative terms – but still a significant advantage – is the idea that adopting shared cloud infrastructure will

**Fig. 9** What are the principal advantages of cloud technology for processing video?



**Fig. 10** What are the main challenges to the adoption of cloud technology for video processing and distribution?



enable service providers to devote more attention to core competencies such as packaging and marketing their offerings, rather than devoting a lot of attention to technology. (Fig.9)

In addition to benefits, we asked respondents to rate potential challenges to the use of cloud technology for video processing.

The first thing to note is that none of the potential pitfalls appear to be particularly insurmountable, at least in the view of our survey sample.

The most significant challenges, in the view of respondents, are organisational rather than technical.

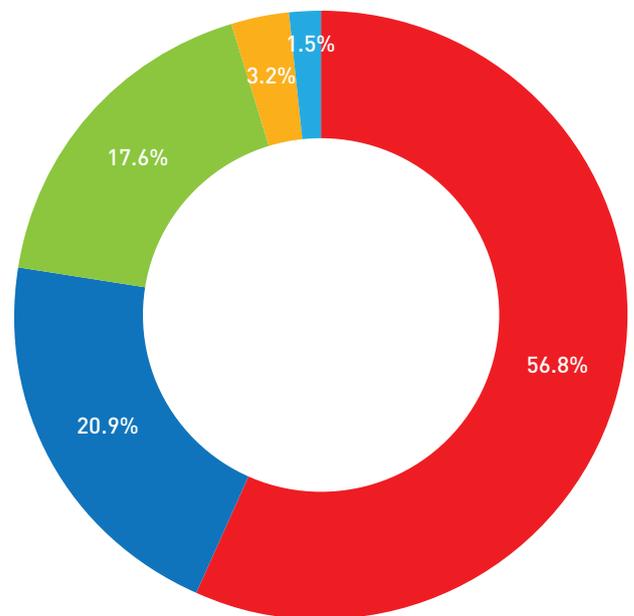
The challenge presented by the organisational and cultural changes required by migration to the cloud, and the need to change the way costs are allocated – notably from capex to opex – are seen as significant: 30.9% of respondents rated organisational and cultural changes as very important and 27.7% rated cost-accounting changes as very important.

The state of maturity of the technology and the threat of loss of control by service providers from migrating to the cloud respectively are less important. Only 23.7% of respondents think cloud technology is definitively not yet mature enough to fully replace on-premises hardware, while loss of control is seen as a very important hurdle by only 21.9%. (Fig.10)

We asked survey respondents to express a view on how efficient cloud infrastructure will be, compared with on-premises hardware, in processing video.

The vast majority of respondents believe that cloud-based processing is more efficient than on-premises broadcast technology, at least in some respects, and that it will ultimately supersede on-premises infrastructure.

**Fig. 11** How efficient is cloud infrastructure for video processing compared with on-premises infrastructure?



- Cloud-based video processing is more efficient in some respects to on-premises technology and will ultimately supersede it
- Cloud-based video processing is inherently more efficient than on-premises technology and will quickly supersede it
- Cloud-based video processing is more or less equal to on-premises technology in terms of efficiency
- Cloud-based video processing currently is at a clear disadvantage to on-premises technology and is not likely to supersede it for a long time
- Cloud-based video processing is inherently inferior to on-premises technology and is never likely to supersede it

Some 20.9% agree with the view that cloud-based video processing is inherently more efficient than on-premises technology and will quickly supersede the latter, while 56.8% believe that cloud processing is more efficient in at least some respects, and will ultimately supersede hardware.

Some 17.6% believe that cloud processing is more or less equivalent to on-premises technology in terms of efficiency, but only a tiny minority believe that cloud technology is at a clear disadvantage to on-premises hardware or is inherently inferior to it. (Fig.11)

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### Conclusion

The adoption of cloud technology is set to have a transformative impact on the video delivery business, at least in the view of respondents to this survey.

Our respondents believe that the impact of the cloud will be felt, and is being felt, across a wide range of consumer-facing applications and back-end functions. In terms of consumer-facing applications, the biggest impact will be on TV everywhere – the delivery of video services to multiple screens. The cloud will also have a major impact on the delivery of on-demand services. A large majority of respondents also believe that the provision of on-demand services from the cloud is vastly more efficient than via legacy technology.

The biggest impact of cloud technology related to video service providers' back-end infrastructure will be on video processing/compression. Here, the key advantages are the ability of cloud infrastructure to enable operators to scale up rapidly according to demand combined with the ability to launch a service without a big upfront investment in infrastructure. Survey respondents also rate the economies of scale provided by using shared infrastructure as a significant advantage.

Respondents are confident that cloud technology is now sufficiently mature to come good on its promise. The remaining challenges in migrating to the cloud have much more to do with how companies are organised, and the changes that will be necessary in the way investment costs are accounted for.

Overall, respondents believe that the cloud is vastly more efficient for processing video than on-premises hardware, and is ultimately likely to supersede the latter. ●

# OTT TV distribution

## Introduction

OTT TV is now a mainstream delivery platform alongside infrastructure-based pay TV and traditional broadcast.

The use of OTT TV as a distribution mechanism has expanded rapidly and linear TV offerings are increasingly available on OTT platforms alongside on-demand content. But when is OTT TV more suitable as a distribution choice than traditional broadcast or IPTV? The key advantage of OTT is its ability to target dispersed groups of users irrespective of geography.

The key challenge is competition for available content and, to some extent, for the same groups of potential subscribers.

With many markets and groups of consumers around the world still being relatively underserved, new service providers have an opportunity to take advantage of the relatively low entry costs of OTT and the ability of platforms to rapidly scale up operations as demand for services grows.

## MaginePro

Magine Pro build thriving OTT businesses and create branded video streaming services for live, linear TV and VOD content. They leverage their years of consumer market experience to provide their partners with trusted and proven solutions and offer everything from the technical platform to fully managed end-to-end OTT solutions.

Magine Pro's video services are cost-efficient and scalable, from proof-of-concept Pioneer platforms to Premium services that enable their partners to launch in global markets, monetize content and distribute to audiences around the world. They provide all the tech, tools and

insight you need to launch a successful video streaming service and grow sustainably. Their customers are located in Europe and the United States as well as in emerging markets such as Asia, the Middle East, and Africa.

Magine Pro also facilitate barrierless distribution through their integrated global network, the Streaming Superhighway, which is built to connect content creators and distributors, enabling them to distribute and deliver more great content in new markets to larger global audiences.

# OTT TV distribution

## OTT as a mainstream platform

OTT TV has been a mainstream distribution mechanism for premium video for some time now, and its relevance within the overall video distribution business continues to grow.

Recent years have seen OTT expand from its roots as a mechanism to deliver video-on-demand to a platform for holistic pay TV offerings including linear channels. Existing pay TV operators have embraced OTT as a way to reach new audiences.

Nevertheless, the perception that OTT is more suitable for some types of application and content than others is alive and well.

We asked our survey respondents to identify the types of content that OTT is best-suited to serve.

On-demand movies and series remain the mainstay of the OTT universe. Some six in 10 survey respondents rated OTT as a highly effective way to deliver such services, with a further 31.3% rating it as moderately effective.

On-demand long-tail content came a close second in the list of content types for which OTT is suitable. Some 55.8% of respondents think that OTT is a highly-effective mechanism to deliver this type of content.

Number three on the list is a mix of live and on-demand content targeted at a global diaspora audience. Migrant communities that want to view content from their home countries is a growing and still underserved market. Since such audiences are dispersed across multiple markets, OTT is seen as a highly effective way to target them.

Number four in terms of suitability for OTT is niche-interest or long-tail linear TV channels, for which OTT is seen as highly suitable by 40.3% of respondents and as moderately suitable by the same proportion.

Live and on-demand content targeted at a broad international audience – the Amazon model – comes next in the list of service types for which OTT is seen as a distribution mechanism. Some 39.6% of respondents think OTT is a highly effective mechanism to deliver this type of content while a similar number think it is moderately effective.

OTT is seen as highly effective as a distribution channel for live sports by 30.2% and as moderately effective by 34.5%, but a substantial minority believes it is not particularly or not at all effective for this. Opinion is divided about the effectiveness of OTT as a distribution channel for mainstream pay TV channels and for mainstream free-to-air channels, and there is markedly less enthusiasm about the suitability of OTT for this type of content. (Fig. 12)

These preferences are reflected in respondents' views about the most compelling reasons for consumers to sign up for OTT TV services. Here, the availability of original content that is not available elsewhere is the top reason cited, along with the availability of content on multiple screens.

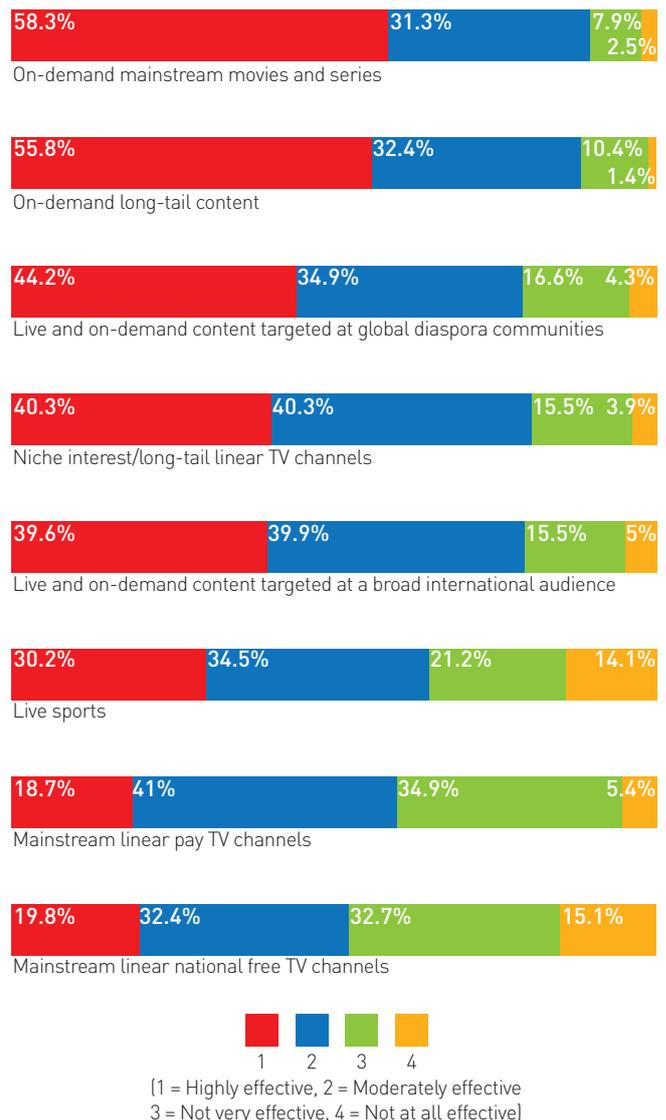
Some 62.9% of respondents believe that the availability of exclusive original content is a very important reason to sign up for OTT TV, with a

further 25.2% agreeing that it is a moderately important reason.

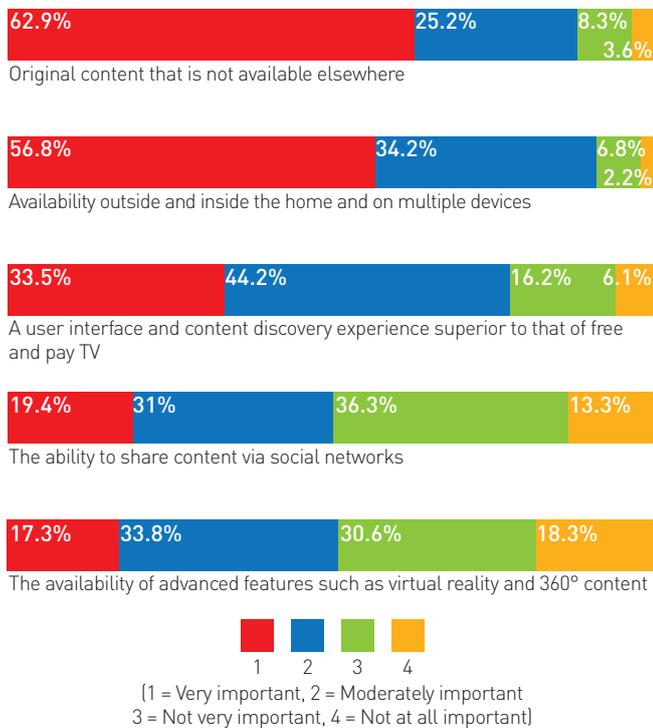
This compares with 56.8% that believe availability on multiple screens outside and inside the home is a very important reason to sign up, with 34.2% citing this as a moderately important reason.

Beyond multiscreen availability, the most important functionality feature of OTT as an incentive to sign up is, in the view of respondents, the availability of a user experience that is superior to that of pay TV.

**Fig. 12** To what extent do you think that a pure OTT TV offering is the most effective way to serve the following types of content?



**Fig. 13** What are the most compelling reasons to sign up for an OTT TV service?



Of markedly less importance is the ability to share content over social networks, which is seen as either not very important or not at all important by half of all respondents, and the availability of new advanced features such as virtual reality/360° content, seen as not important by a similar proportion. (Fig. 13)

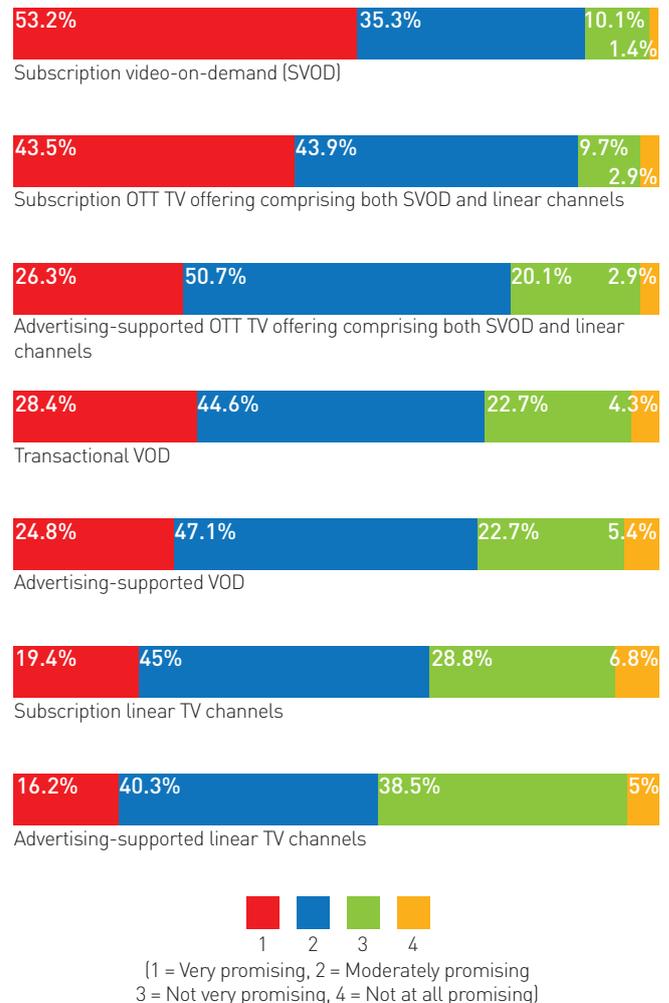
Unsurprisingly, subscription is the favoured business model, whatever the functionality of the individual service. Asked how promising they think various OTT TV business models are, our respondents gave subscription video-on-demand – the Netflix model – top marks, followed by subscription offerings that combine both SVOD and linear channels.

Some 53.2% of respondents say that SVOD is a very promising business model, with a further 35.3% saying it is moderately promising. For the mixed linear and VOD subscription model, the scores are 43.5% and 43.9% respectively.

Services that mix both subscription and advertising elements come next in the list of preferred business models, followed by transactional video-on-demand. The least-favoured subscription model is one comprising linear channels only, with no on-demand element.

Pure advertising models in general fare less well. Neither advertising-supported VOD nor advertising-supported linear channels are rated very promising by a significant number of respondents. There is less enthusiasm for ad-supported linear channels delivered over OTT, with 43.5% of respondents rating this as either not very promising or not at all promising. (Fig. 14)

**Fig. 14** How promising do you think the following business models for OTT TV are in terms of their potential to deliver value to service providers?



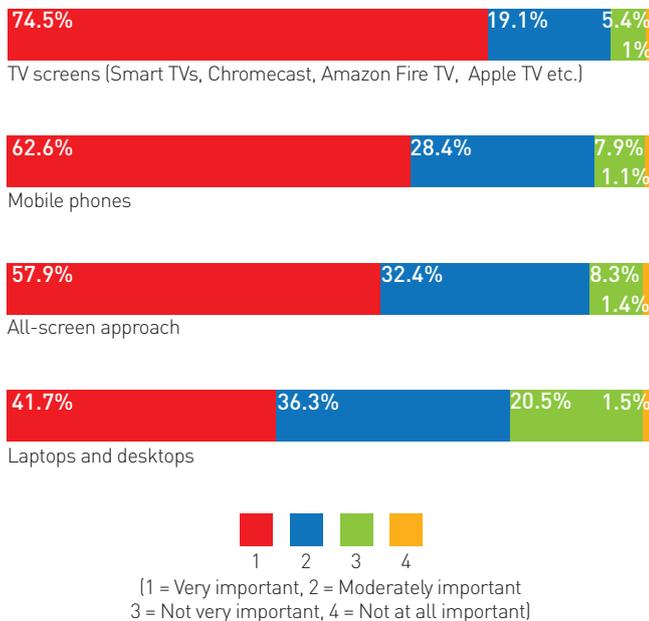
## Reaching screens and building services

The availability of content on multiple screens is the highest-rated reason for consumers to sign up for OTT TV services after the availability of exclusive content, according to our survey respondents. But what does the ability to reach multiple screens mean in practice?

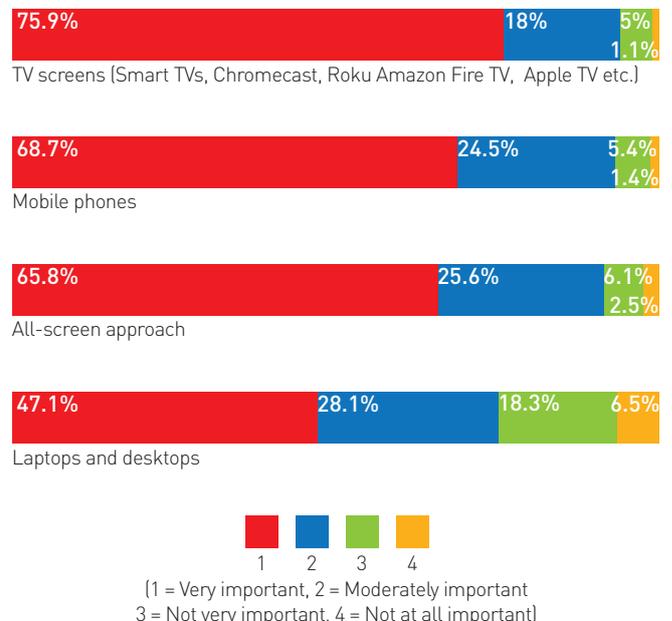
We asked our survey respondents how important it is for an OTT TV service to reach various types of screens now. Despite the popularity of mobile viewing, the ability to reach TV screens remains the single most important distribution goal. Three in four respondents say that reach the TV screen – including via a streaming device such as Chromecast, Roku, Amazon Fire TV or Apple TV as well as via a smart TV portal – is very important for OTT TV providers.

Reaching mobile phones comes next. Some 62.6% believe this is very

**Fig. 15** How important do you think it is now for an OTT TV service to reach the following types of screen?



**Fig. 16** How important do you think it will be for an OTT TV service to reach the following types of screen in five years' time?



important, with a further 28.4% believing it to be moderately important.

Some 57.9% of respondents believe an 'all-screen' approach is very important, with 32.4% believing it to be moderately important.

Laptops and desktops, meanwhile, trail at the rear, despite their continued popularity as devices for the consumption of OTT TV. While 41.7% believe that reaching these devices remains very important, some 22% believe that delivering a service to laptops and desktops is either not very important or not at all important. (Fig. 15)

We also asked respondents to express a view on how important these different screen types will be in five years' time.

There is in fact a remarkable degree of consistency between the answers to this question and those to the previous one. The order of importance of the four categories remains the same – TV first, mobile phones second, an all-screen approach third and laptops and desktops fourth. The proportion of 'very important' ratings for TV screens even increased slightly, and the allocation of 'very important' ratings for mobile phones and for an all-screen approach increased significantly. However, the allocation of 'very important' ratings to desktops and laptops also increased, despite predictions that these devices are likely to become less relevant as points of consumption for media. (Fig. 16)

Technology is perhaps less important than content. Survey respondents certainly seem to take this view when considering the main challenges OTT TV service providers face.

Asked to rate a series of potential challenges to the success of OTT services in terms of their importance, respondents made it clear that the cost and availability of content are the key areas of concern.

The top-rated challenge is the need to secure content rights for multiple devices and multiple territories and in attractive windows. This

is rated a very important challenge by 64% of respondents and as a moderately important challenge by 28.4%.

Following closely behind is the cost of rights to relevant content, rated a very important challenge by 61.9% and a moderately important challenge by 27.3%.

Next in the list of challenges, in order of importance, is marketing – identifying, reaching and keeping subscribers. This is rated very important by over half of respondents and as moderately important by 30.2%.

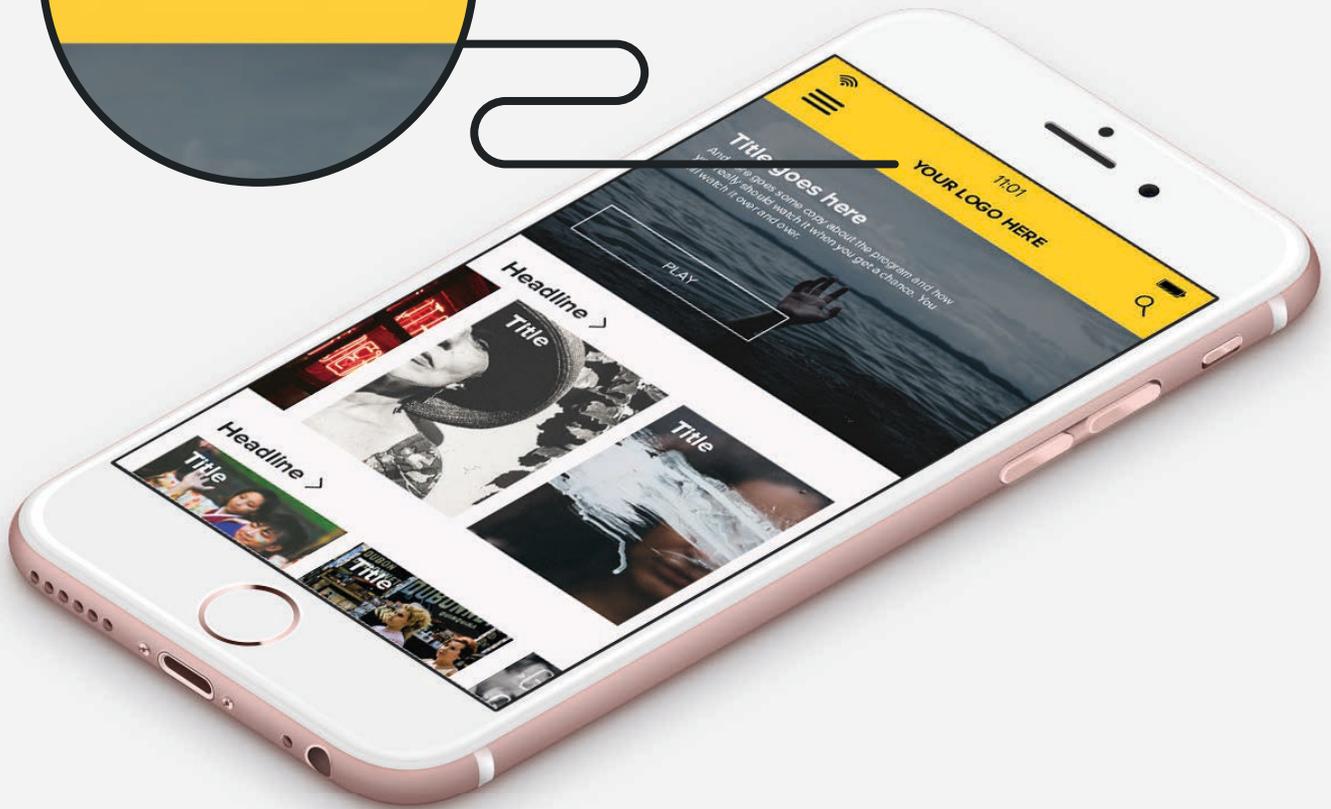
Also important – but perhaps less urgent than the question of how to secure content – is the increasingly competitive nature of the OTT TV space. This is considered a very important challenge by 41.4% and a moderately important one by a similar proportion of respondents, giving rise to a sense that a significant number still think there is room for new entrants.

Technology and operational concerns, on the other hand, attract significantly less attention. Some 37.1% of respondents believe that the upfront cost and complexity of building an OTT TV platform, including integrating with multiple devices and DRM systems, is a very important challenge, with 45.3% seeing it as a moderately important challenge.

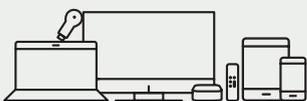
Ongoing costs of operating a platform, including bandwidth costs, are seen as a very important challenge by 31.7% and a moderately important challenge by 44.2%, with a significant minority not seeing this as a major challenge at all. (Fig. 17)

One reason that technical challenges may no longer be so important is that much of the work involved in building and even running an OTT service can now be outsourced. Respondents to our survey clearly appreciate the merits of outsourcing at least part of the business of

# Your brand. Your content. Your OTT business.



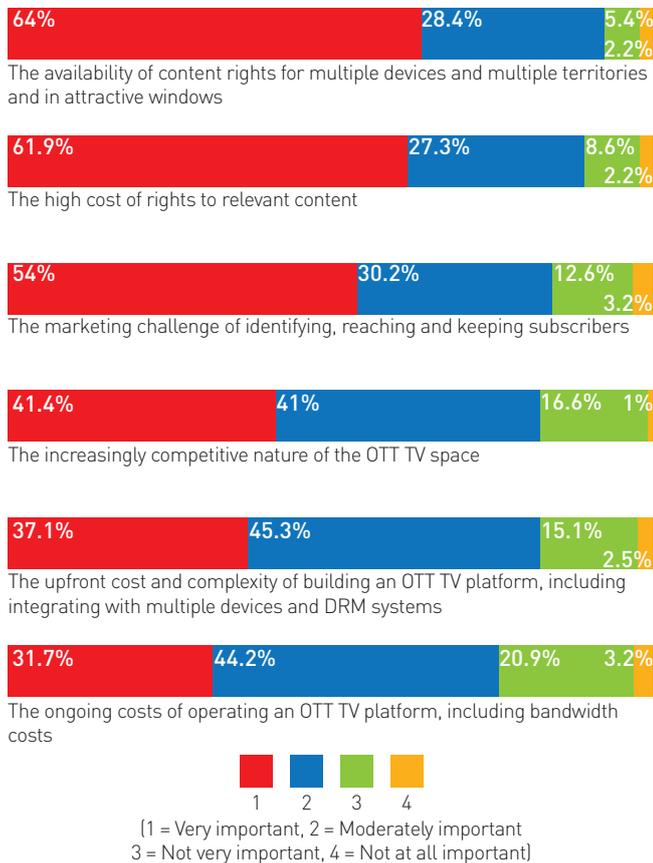
We provide all the tech, tools and insight you need to launch a professional video streaming service today.



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**Fig. 17** How important are the following challenges or obstacles to launching an OTT TV service?



building and running a service, although opinions differ on how far to go with this.

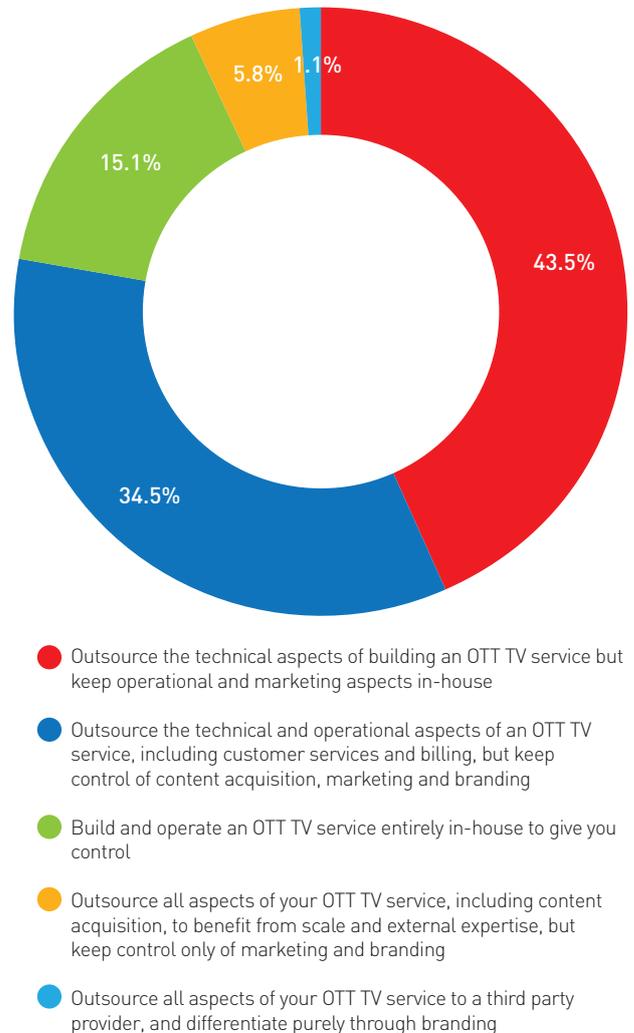
Only 15.1% of respondents believe that building and operating an OTT TV service entirely in-house is the approach that makes most sense.

The most popular approach is to outsource the technical aspects of building a service while keeping operational and marketing functions in-house, favoured by 43.5% of respondents.

A deeper level of outsourcing, involving farming out the technical and operational aspects of an OTT TV service, including customer services and billing, but keeping control of content acquisition, marketing and branding, is favoured by 34.5%.

Outsourcing beyond this point attracts few adherents. Only 5.8% favour outsourcing all aspects of the service – including content

**Fig. 18** Which approach to building an OTT TV service makes the most sense?



acquisition in order to benefit from scale and external expertise, keeping only marketing and branding in-house, and only 1.1% favour outsourcing everything, differentiating only through branding. (Fig. 18)

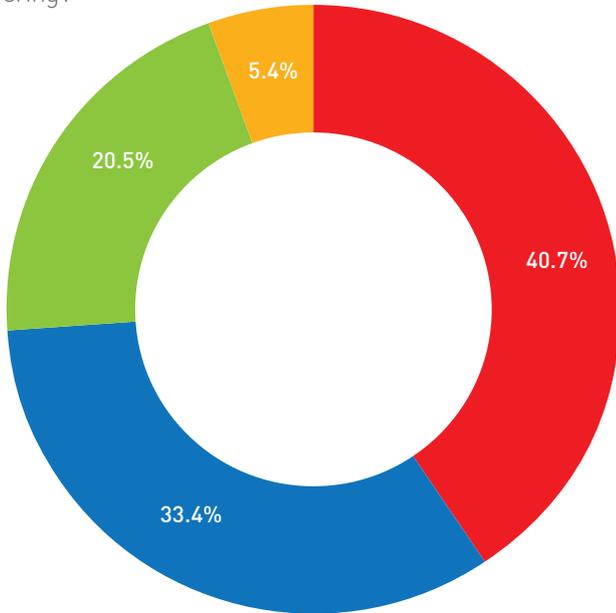
In terms of choosing suppliers, the most favoured option among survey respondents is to outsource different elements of the process to multiple 'best-of-breed' suppliers while retaining control of the design and execution of the service in-house – the choice of 40.7%.

About a third of respondents are will going to outsource all technology elements to a single system integrator that will take on the task of recommending suppliers and coordinating design and execution of the service, while a smaller number are willing to go one stage further, outsourcing all elements to a single supplier while managing the service in-house.

Only a small minority of 5.4% of respondents is willing to outsource all elements of the service to an end-to-end white-label provider. (Fig. 19)

**64%** believe that obtaining universal content rights is a very significant challenge for OTT TV operators

**Fig. 19** Which approach to outsourcing makes the most sense for a service provider looking to launch an OTT TV offering?



- Outsource different elements to multiple 'best-of-breed' suppliers and control the design and execution of the service inhouse
- Outsource all technology elements to a single system integrator that will take on the task of recommending suppliers and coordinating design and execution of the service
- Outsource all technology elements to a single supplier, with the service then being managed in-house by the client/service provider
- Outsource all elements of the service, including technology, negotiating/managing content rights and service management, to a full end-to-end white-label provider

## Conclusion

OTT TV is still seen first and foremost as a distribution platform for on-demand rather than live content by the industry.

Movies and series remain at the core of the OTT business, but there is also strong interest in using OTT platforms as a distribution channel for long-tail content.

Despite the predisposition to view OTT as a platform for VOD, there is also interest in using OTT to deliver both live and on-demand content to diaspora or migrant audiences dispersed around the world. OTT is seen as a highly attractive way to target this underserved market.

In the view of our survey respondents, the presence of content not available elsewhere is the primary incentive for people to sign up for OTT TV services. The second most important reason is the multiscreen functionality of OTT TV. However, TVs connected to the internet are the most important device for OTT TV providers to target, followed by mobile devices and, in the view of our survey respondents, this is likely to remain the case for the foreseeable future. The most promising business model for OTT is subscription.

The main challenges faced by service providers in targeting these markets are related to the availability of content at the right price and in the right window. Technology challenges are of secondary importance, and most survey respondents favour a degree of outsourcing the technology side of running an OTT service to outside experts, though opinion is divided on how far to take this. ●

# The live-streaming revolution

## Introduction

OTT TV has long been associated with the delivery of on-demand content. The Netflix model is universally familiar. More recently, however, there has been an explosion in the use of OTT TV platforms to deliver coverage of live events – notably sports – as well as the emergence of ‘skinny bundle’ or ‘pay TV lite’ offerings comprising a mix of on-demand and linear channels.

Live-streaming of mass-audience events such as major sports tournaments is particularly challenging for unmanaged IP platforms, thanks to bandwidth constraints, unpredictable audience size and other factors. While adaptive streaming has helped overcome many of the obstacles in using OTT as a live-streaming platform, challenges remain.

Despite this, the pace of technological advances in video processing, lowering CDN costs and the availability of high-bandwidth access networks is leading many industry observers to believe that OTT is emerging as a viable alternative to broadcast as a live video platform.



Harmonic (NASDAQ: HLIT), the worldwide leader in video delivery technology and services, enables media companies and service providers to deliver ultra-high-quality broadcast and OTT video services to consumers globally. The company has also revolutionized cable access networking via the industry's first virtualized CCAP solution, enabling cable operators to more flexibly deploy gigabit internet

service to consumers' homes and mobile devices. Whether simplifying OTT video delivery via innovative cloud and software-as-a-service (SaaS) technologies, or powering the delivery of gigabit internet cable services, Harmonic is changing the way media companies and service providers monetize live and VOD content on every screen. More information is available at [www.harmonicinc.com](http://www.harmonicinc.com).

# The live-streaming revolution

## OTT TV live-streaming vs. broadcast

The use of OTT TV platforms as vehicles for live-streaming events, as well as the distribution of linear channels over OTT, is a rapidly growing phenomenon.

Live-streaming has long been part of the OTT experience, but the distribution of mass-audience events on OTT TV platforms has been challenging. Technological innovation and the expansion of bandwidth means that this is changing, however, and there are plenty of indications that OTT will ultimately rival broadcast as a vehicle for live events not only in popularity but also in efficiency.

This is certainly the view of survey respondents. We asked our sample to express their opinion about the suitability of OTT TV as a platform for live-streaming of mass-audience content. Over three-quarters of respondents believe that OTT TV will either soon supplant broadcast as the most efficient way to deliver live events or that it could ultimately do so.

Over half of respondents endorse the view that OTT TV is improving as a platform for live streaming and could ultimately replace broadcast as the most efficient way to deliver live event coverage when the technology is more mature, while some 18% believe that OTT is already highly suitable as a platform for live streaming and will soon displace broadcast technology.

Only a minority of respondents believe that OTT is unlikely ever to supplant broadcast for live events. Some 21.2% of respondents believe that while OTT TV is improving as a platform for live streaming, it is unlikely ever to take over from broadcast as the most efficient way to deliver live event coverage. Only a very small minority believe that OTT TV will only ever be suitable for niche-interest content or that it is not suitable for any kind of live streaming. (Fig. 20)

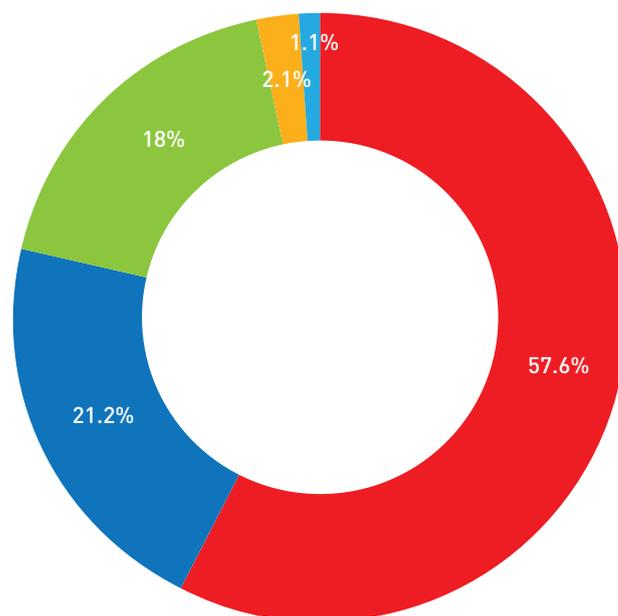
In terms of the type of content that is driving the ongoing live-streaming revolution, big-ticket sports events and concerts stand at the top of the list. We asked our survey respondents to assess which types of content they think are most likely to see the biggest impact from OTT live-streaming. Almost half believe that major mass-audience sports and concerts will see a very significant impact, with over a third believing these types of content will see a moderately significant impact.

Our survey sample also believes that smaller-scale one-off sports events, concerts and other niche events will see a big impact, with four in 10 believing these types of event will see a very significant impact and over a third believing they will see a moderately significant impact.

Survey respondents also believe that niche-interest linear TV channels focusing on sports and hobbies will see a big impact from OTT live-streaming, as will red button-type complementary or second-screen content associated with bigger live events, such as the streaming of alternative sports matches, interviews and back-stage coverage.

Of less interest in terms of the overall impact they are likely to see from the application of live-streaming is other types of linear scheduled

**Fig. 20** Which of the following statements best expresses your opinion about the suitability of OTT TV as a platform for live-streaming of mass-audience content?

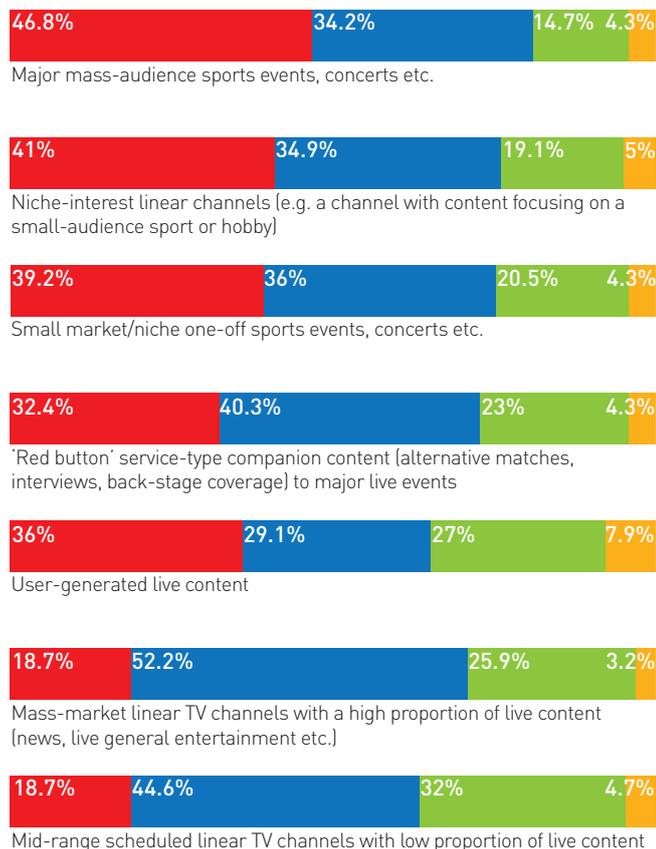


- OTT TV for live streaming is improving and could ultimately supplant broadcast when the technology is more mature
- OTT TV for live streaming is improving as a platform but is unlikely ever to supplant broadcast
- OTT TV is highly suitable as a platform for live streaming and will soon supplant broadcast
- OTT TV is not really suitable as a platform for live streaming
- OTT TV is suitable for live streaming of niche-interest content only and will never supplant broadcast for mass-audience events

TV channels. Here at least it seems that broadcast is likely to continue to play a significant role into the future. This is particularly true of mid-tier linear TV channels that have a lower proportion of live content. Only 18.7% of respondents believe that this type of channel will see a big impact from OTT TV, while some 44.6% believe mid-range channels will see a moderately significant impact. (Fig. 21)

The use of live-streaming as a complement to, rather than a substitute for broadcast attracts considerable interest in terms of having value to consumers, with sports again seen as a key driver. Asked to consider the 'complementary' applications of live-streaming, survey respondents took the view that the use of the technology to extend the reach of broadcast, for example to expatriate audiences, has the greatest potential to deliver additional value to consumers. Almost half

**Fig. 21** Which of the following types of content do you think are most likely to see the biggest impact from OTT live-streaming?



1 2 3 4  
 [1 = Very significant impact, 2 = Moderately significant impact  
 3 = Not very likely to see an impact, 4 = Not at all likely to see an impact]

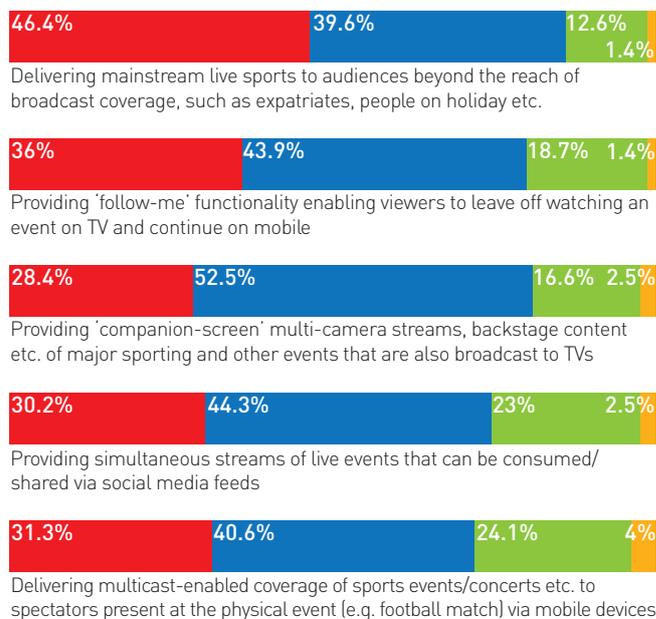
of respondents believe that this type of application has high potential with a further 39.6% believing it has moderate potential.

Providing 'follow-me' functionality enabling viewers to leave off watching an event on TV and continue on mobile devices, for example, is also favoured, with four in 10 respondents believing this to have high potential and a further 43.9% believing it to have moderate potential.

Providing companion-screen services such as multiple camera angles and complementary interview content is also seen as having value to consumers, as is providing simultaneous streams to the main broadcast feed in order to enable sharing of content via social media feeds.

Of marginally less interest is one of the frequently talked-about applications of so-called 'mobile broadcast' technology – the multicast delivery of sports events and concerts to spectators physically present at the event itself via their mobile phones. Nevertheless, some 31.3% of respondents believe this has high potential to deliver additional value, with a further 40.6% believing it has moderate potential. (Fig. 22)

**Fig. 22** Which of the following applications of live-streaming as a complement to broadcast delivery have the greatest potential to deliver additional value to consumers?



1 2 3 4  
 [1 = High potential, 2 = Moderate potential  
 3 = Limited potential, 4 = Little or no potential]

## Demand and supply factors

Survey respondents have clear views about the 'demand-side' trends that are likely to drive growth in OTT live-streaming. Asked to rate five key demand-side trends for their relative importance, our sample clearly believes that consumption of content on smartphones and other IP-connected devices is the key factor.

This applies both outside and inside the home, with over half of respondents believing that growing multiscreen consumption of content in both environments is a very important driver of OTT live-streaming.

Also highly important as a demand-side driver of OTT live-streaming is a growing interest in consuming professional-quality live content that is not distributed via traditional TV networks, such as coverage of minority sports. Over a third of respondents believe this will be very important, while almost half believe it will be moderately important.

Of somewhat less relevance as a driver of live-streaming is the sharing of content via social networks and growth in the availability of user-generated live streams. Just over one in five respondents believe that either will be a very important driver, while over a third of respondents believe that these will be either not very important or not at all important. (Fig. 23)



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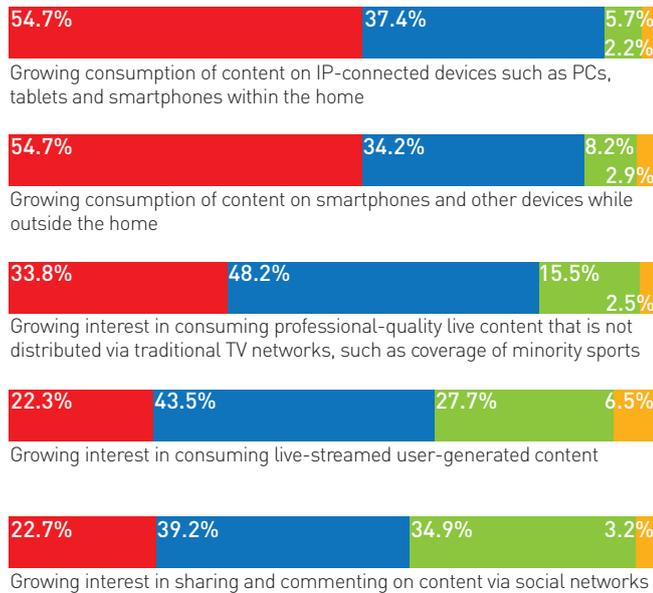


Services



Playout

**Fig. 23** Which of the following ‘demand-side’ trends/developments is likely to be a major driver of growth in OTT live-streaming?



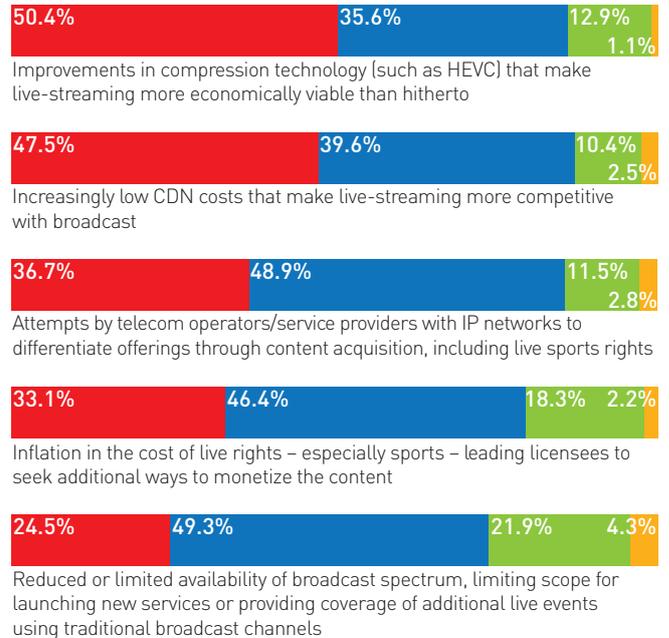
[1 = Very important, 2 = Moderately important  
 3 = Not very important, 4 = Not at all important]

Turning to ‘supply-side’ trends and developments, the key drivers for OTT live streaming are, in the view of survey respondents, improvements in compression technology and lowering of CDN costs. Over half of respondents believe that improvements in compression technology that make live-streaming more economically viable will be a very important driver for OTT live-streaming, while 47.5% believe lowering CDN costs will be a very important driver.

Competitive pressures on telecom operators and other distribution providers will also be a significant factor, according to respondents. Some 36.7% believe that attempts by telecom operators to differentiate their offerings through content acquisition, including of live sports rights will be a very important drive, while just under half believe this will be a moderately important driver.

Somewhat further down the scale in order of importance is the ongoing diminution of available broadcast spectrum, which could limit scope for launching new services or providing coverage of additional live events using traditional broadcast channels. This is seen as very important by about a quarter of respondents and moderately important by about half. (Fig. 24)

**Fig. 24** Which of the following ‘supply-side’ trends/developments is likely to be a major driver of growth of OTT live-streaming?



[1 = Very important, 2 = Moderately important  
 3 = Not very important, 4 = Not at all important]

## Challenges and technological evolution

If the growing availability of bandwidth is a key factor that is driving interest in live-streaming, the need for sufficient bandwidth also figures large in the list of challenges facing providers of live-streaming services.

Asked to rate a number of challenges in terms of their significance for the future of live-streaming, survey respondents highlighted providing adequate bandwidth, Quality of Experience and latency.

Quality of Experience in particular is seen as a potential source of trouble. Some 63.7% of respondents rated the provision of QoE in the case of bandwidth-adaptive streams as a very significant challenge, with a further 27.3% rating it as moderately important.

Providing adequate bandwidth or CDN capacity is next on the list. Some 55.8% of respondents rated the provision of adequate bandwidth/CDN capacity for hard-to-predict numbers of simultaneous users as very important.

Third on the list of challenges is latency. The need to reduce the latency of the live stream to match the timing of the broadcast of the event – thus avoiding problems such as hearing your neighbours cheer a goal in a football match before you see it ‘live’ – is seen as a very important challenge by half of respondents, while a third see it as moderately important.

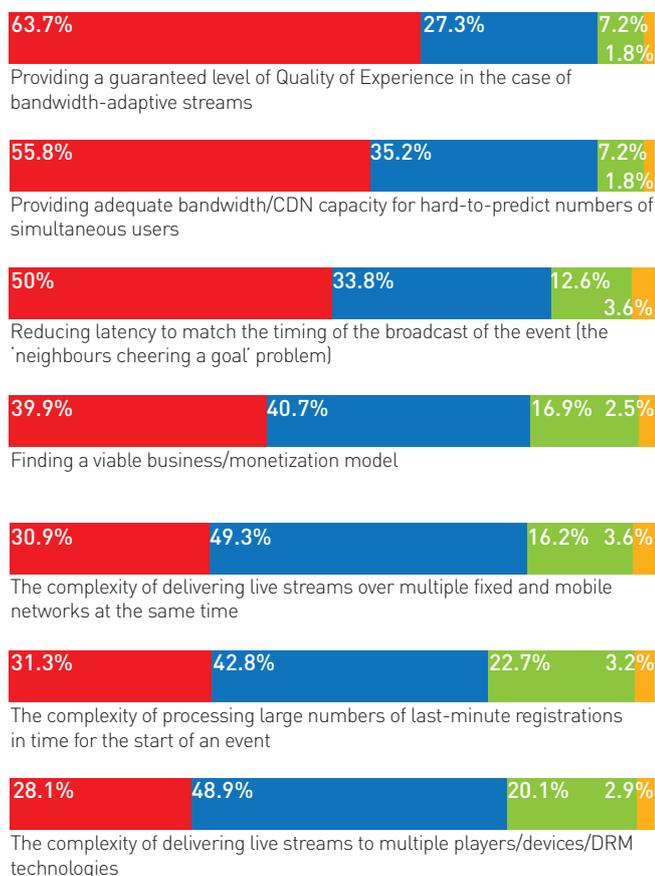
# 48% believe improvements in video compression will have a transformative impact on OTT live-streaming

The next most-important challenge, in the view of survey respondents, is finding a viable business model for live-streaming. This non-technical challenge is seen as very significant by four in 10 respondents and as moderately significant by a further four in 10.

Lesser challenges include the complexity of delivering live streams over multiple fixed and mobile networks at the same time, the complexity of delivering live streams to multiple players, devices and DRM technologies, and the complexity of processing large numbers of last-minute registrations in time for the start of an event. (Fig. 25)

While technical challenges are clearly still important, solutions are in development that will help to overcome many of them.

**Fig. 25** What are the big challenges service providers face when live-streaming a major event, such as a sports event, over the internet?



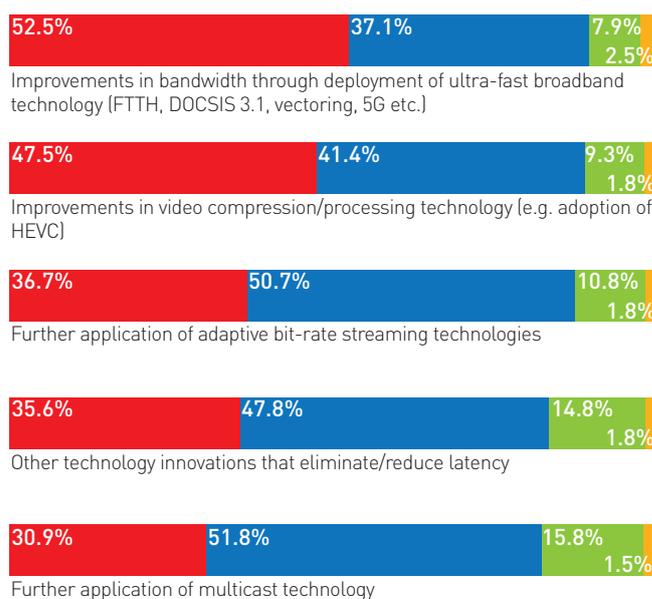
1 = Very significant challenge, 2 = Moderately significant challenge  
3 = Not very significant challenge, 4 = Not at all a significant challenge

Asked to rate key technology developments that will have a positive impact on the ability of OTT TV service providers to live-stream content, respondents again saw growth in bandwidth as the number one factor. Over half rated improvements in bandwidth through the deployment of technologies such as FTTH, DOCSIS 3.1, vectoring and 5G as likely to have a transformative positive impact.

Improvements in video compression follow close behind on the scale. Some 47.5% of respondents rated improvements in video processing technology is likely to have a transformative positive impact, with 41.4% taking the view that this would have a significant positive impact that falls short of being transformative.

Other technological advances that are likely to have a significant – but not transformative – impact include, in order of importance, the further application of adaptive bit-rate technology, technology innovations that help eliminate or reduce latency, and the further application of multicast technology. (Fig.26)

**Fig. 26** Which of the following technology developments will have a major positive impact on the ability of OTT TV service providers to live-stream content to users in the medium term?



1 = Transformative positive impact  
2 = Significant but not transformative positive impact  
3 = Moderate positive impact, 4 = Zero or negative impact

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## Conclusion

OTT TV is now established as a platform for live-streaming of events as well as linear channels, with the popularity of viewing major sports and other events on multiple devices a key driver behind this.

Survey respondents believe that the momentum behind OTT live streaming mean that OTT TV is emerging as a viable rival to broadcast technology for live events. A majority in fact believes that OTT will ultimately supplant broadcast for live events.

The use of OTT to deliver linear channels generally is seen as something that will apply, in the first instance, to niche-interest services.

While mainstream national TV channels are more likely to be primarily consumed on broadcast platforms for some time to come, growth in applications to complement linear broadcast transmission is also seen as a significant driver behind OTT live-streaming in general. Delivery of streamed coverage of events to spectators present at the event itself is seen as more of a niche activity.

The key driver behind the popularity of OTT live-streaming is the consumption of content on IP-connected devices including mobile phones. Survey respondents also believe that the opportunity to use OTT live-streaming capability to deliver additional content that is not available via broadcast channels will be an important driver for the technology.

The technological drivers behind growth in OTT live-streaming are primarily related to lower CDN costs and growth in bandwidth on one hand, and improvements in video processing technology on the other. Improvements in compression technology are seen as particularly important.

Lack of available bandwidth is also seen as a key challenge for providers of live-streaming services, with the risk of poor Quality of Experience and the problem of latency perceived as key hurdles to overcome.

Improvements in broadband technology such as the deployment of fibre and DOCSIS 3.1 are seen as important solutions – alongside improvements in video compression technology. The combination of more available bandwidth and more efficient video processing are likely to further accelerate the adoption of OTT TV as a platform for the consumption of live content. ●

# The cloud, data and security

## Introduction

The wealth of data now available to video service providers holds the promise of transforming their business by enabling them to operate their networks more efficiently and personalise the services they provide for customers.

The application of data analytics to video service delivery is only just beginning. Ultimately, data could be used not only to proactively monitor the performance of delivery networks but also to enable services to be tailored to the needs of individual consumers and even to help service providers decide what content to acquire or make.

However, operators know that making sense of data and using it effectively requires investment. They can see the promise, but also the hurdles that stand in their way.

Not least of these is concern about security. If operators are unable to persuade their customers that personal data is safe in their hands the application of data analytics is unlikely to make much progress.

We asked survey respondents to consider how data can best be used and what the key challenges are.



Verimatrix specializes in securing and enhancing revenue for network-connected devices and services around the world and is recognized as the global number one in revenue security for IP-based video services. The award-winning and independently audited Verimatrix Video Content Authority System (VCAS) family of solutions enables next-generation video service providers to cost-effectively extend their networks and enable new business models. Its unmatched partner ecosystem enables Verimatrix to provide unique business value beyond

security as service providers introduce new applications that leverage the proliferation of connected devices.

The company has continued its technical innovation by offering a comprehensive data collection solution, Verspective Analytics, for automated system real-time quality of experience (QoE) optimization to drive user engagement and content monetization. [www.verimatrix.com](http://www.verimatrix.com)

# The cloud, data and security

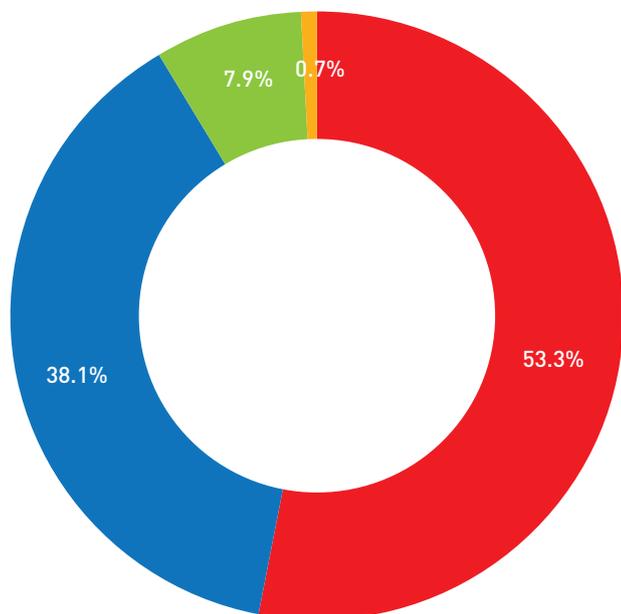
## The impact of data analytics

The amount of data about consumer habits and network performance that is available to service providers is almost unlimited, but operators are only at the beginning of the process of making sense of the data and figuring out what the most useful applications are.

Analysing and applying data across multiple touch points requires a lot of resources and a lot of time. Operators are often focused on other objectives.

Nevertheless, the success of OTT TV providers such as Netflix is attributed in no small way to their mastery of data, and established media players know that data will be of key importance in unlocking potential new revenue.

**Fig. 27** Which of the following statements best expresses your opinion about the potential of data analytics to transform or enhance the business of video service providers



- Data analytics has the potential to enhance but not transform the business of video service providers
- Data analytics has the potential to completely transform the business of video service providers
- Data analytics will only have a modest impact on the business of video service providers
- Data analytics will have a negligible impact on the business of video service providers

Survey respondents therefore believe that data analytics will have a significant impact on the business of video service providers. Almost one in three respondents believe that data analytics has the potential to completely transform service providers' business, while over half believe analytics will enhance their business even if not in a way that can be described as transformative. Just 7.9% believe data analytics will have only a modest impact, while less than 1% believe it will have a negligible impact. (Fig. 27)

Few doubt then that data analytics is set to play a role in shaping the fortunes of TV service providers. The questions around exactly what that role will be and who stands to benefit elicit more varied responses however.

We asked survey respondents to rate eight potential applications of data analytics for their potential to deliver value to service providers.

The key finding is that our survey sample believes data about viewers and their behaviour has the greatest value.

In the collective view of respondents, the use of analytics as a tool to monitor viewing habits, such as choice of content, and to develop packages and marketing campaigns that match those habits, is the most fruitful of all applications. Almost three in five respondents believe this has very high potential, and a third believe it has quite high potential.

This is closely followed in the list of apps most valued by respondents by the use of data to monitor broader viewing behaviour, such as time spent viewing on a particular device, to enable service providers to prioritise certain infrastructure investment choices. Some 55.7% believe this has very high potential, and a further third of respondents believe it has quite high potential.

Respondents also believe that data analytics about viewer habits can profitably be used to help with decisions about what content to acquire, commission and produce, with over half of respondent believing this to have very high potential.

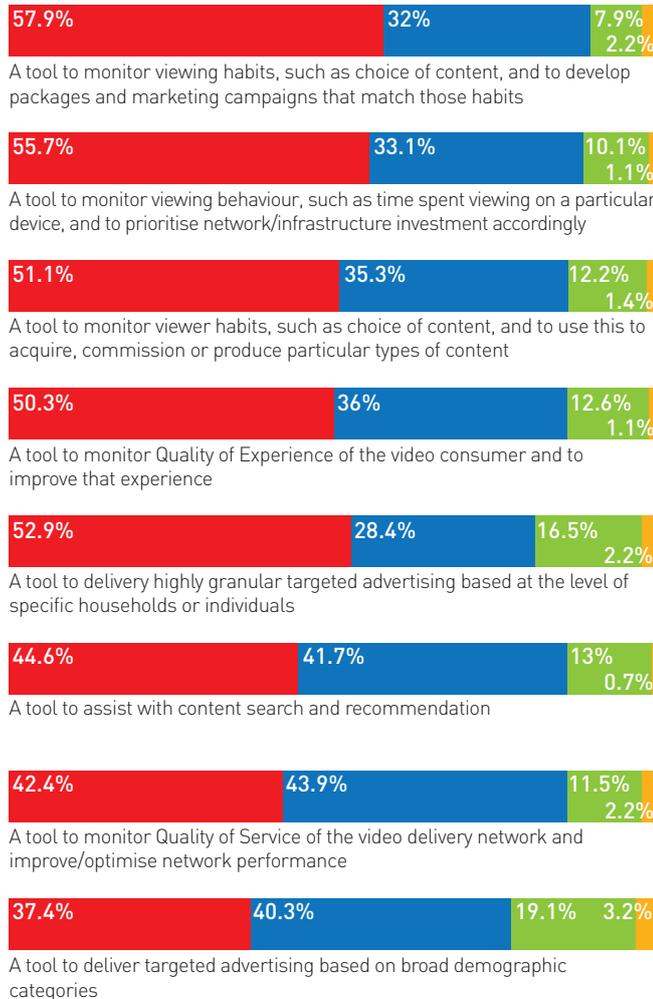
Other applications considered, in the order of their perceived usefulness to service providers, are: a tool to monitor Quality of Experience of the consumer; a tool to deliver highly granulated targeted advertising at household or individual level; a tool to assist with content search and recommendation; a tool to monitor Quality of Experience of the video delivery network; and a tool to deliver targeted advertising based on broad demographic categories. (Fig.28)

When we asked survey respondents to consider the usefulness of the same set of applications in delivering value to the consumer rather than the service provider, respondents were somewhat more sceptical about how welcoming and appreciative those consumers would be of service providers' efforts to use their data.

Most likely to be appreciated by consumers, in the view of respondents, is the use of data analytics to assist with content search and recommendation. This is believed to have very high potential by 47.1% of the sample. Next in line is a tool to monitor Quality of Experience of the video consumer, highly useful for 44.2%.

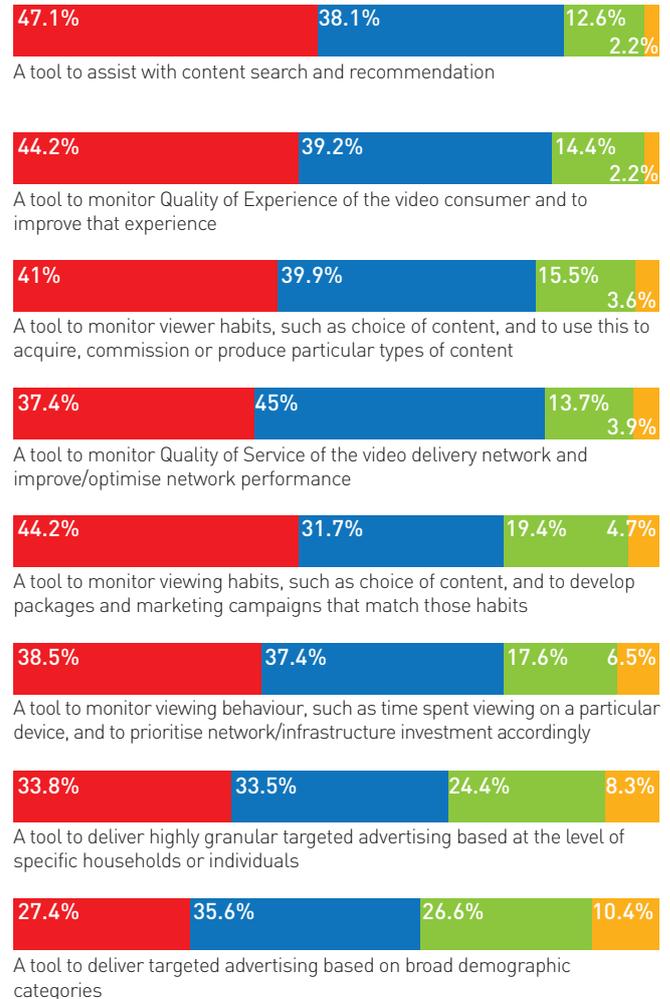
Respondents also believe that using data to monitor viewing habits

**Fig. 28** How much potential do you think the following applications of data analytics have to deliver value for service providers?



1 2 3 4  
 [1 = Very high potential, 2 = Quite high potential  
 3 = Quite low potential, 4 = Very low potential]

**Fig. 29** How much potential do you think the following applications of data analytics have to deliver value for consumers?



1 2 3 4  
 [1 = Very high potential, 2 = Quite high potential  
 3 = Quite low potential, 4 = Very low potential]

to develop packages and marketing campaigns, and using it to take decisions on acquiring, commissioning and producing content, also has potential to benefit consumers.

Survey respondents seem to be less convinced by the argument that delivering ‘more relevant’ advertising has value for consumers. The use of data analytics to deliver targeted advertising – either to broad demographic groups or at the household/individual level – comes bottom of the list in terms of its perceived value to consumers. (However, this needs to be put in context: substantial numbers of respondents still believe these applications do have some value – just not nearly as many as believe in the value of data to make content recommendations, and far fewer than believe in the value of data analysis to service providers

as opposed to consumers.) (Fig.29)

We also asked survey respondents to express a view on which types of video delivery organisation stand to benefit most from the application of data analytics.

Here, SVOD OTT providers are the clear winners. Three in five respondents believe Netflix and its peers are very likely to benefit from data analytics. This ties in neatly with the view that the use of analytics as a tool to monitor viewing habits, such as choice of content to help service providers take decisions, is an application with high potential.

Advertisers, and marketers follow closely behind in the ranking. Some 57.2% of respondents believe advertisers and marketers are very likely to benefit, while a further 32% believe they are quite likely to benefit.

Other strong likely beneficiaries of the application of data analytics, in the view of our survey sample, are multi-play operators, such as cable and IPTV providers, and content creation companies.

Slightly less likely to benefit, in the view of respondents, are advertising-supported free-to-air broadcasters, even though they are most likely to be tasked with putting systems in place to collect consumer data for advertising.

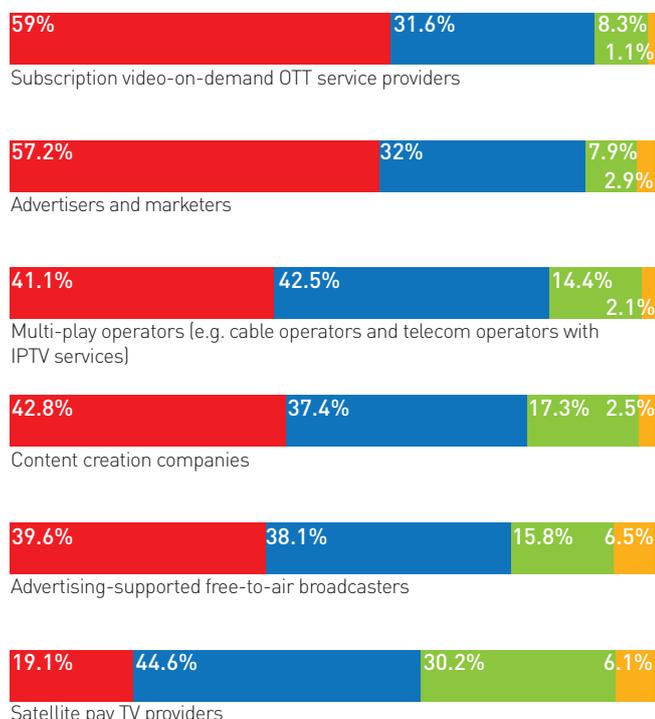
Least likely to benefit from the application of data analytics, in the view of the sample, are satellite pay TV providers. (Fig.30)

## Data and security

Our survey respondents' relative scepticism about the extent to which data analytics will benefit consumers feeds into their views on some of the key challenges standing in the way of unleashing data's potential – where security concerns about personal data come to the fore.

Asked to rate eight major challenges to the adoption of data analytics, over four in five respondents agreed that consumers would resist permitting the use of their data on security grounds and that this would be either a very significant challenge or quite a significant challenge,

**Fig. 30** Which players in the content creation and distribution chain are likely to benefit most from data analytics?



1 2 3 4  
 (1 = Very likely to benefit, 2 = Quite likely to benefit  
 3 = Not very likely to benefit, 4 = Not at all likely to benefit)

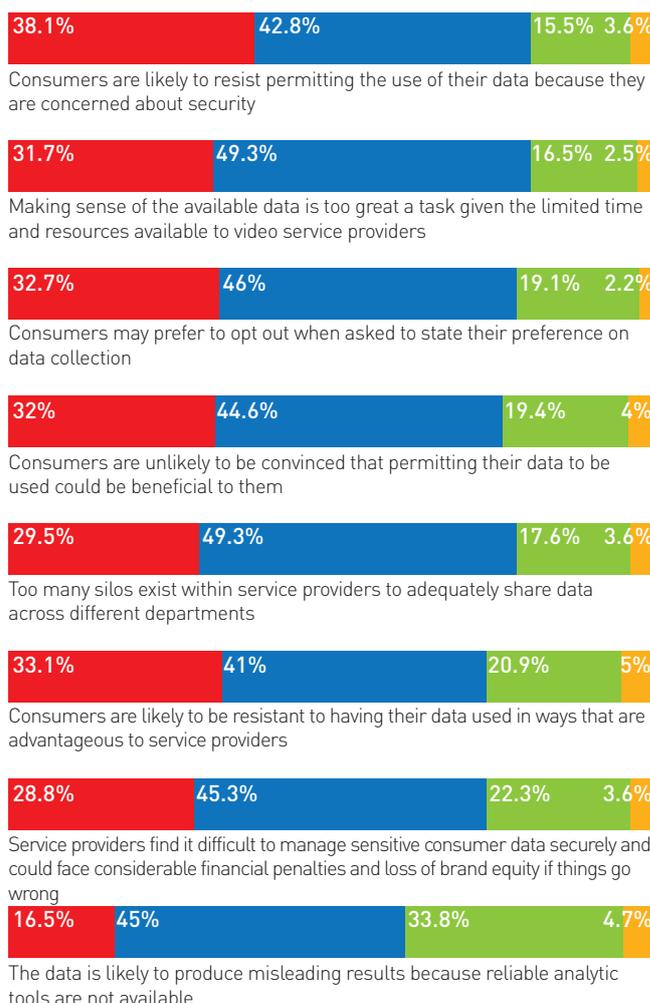
with 38.1% agreeing it is a very significant challenge.

Consumer concerns about security was the top-rated challenge of the eight considered. Numbers two and three on the list concern the capacity of service providers to manage and make use of the data.

Some 31.7% of respondents agreed the size of the task of making sense of available data was a very significant challenge, with a further 49.3% believing it to be quite a significant challenge.

These respondents agree that the key challenge for service providers is a lack of time and resources to make sense of the wealth of data on offer. But service providers also face other challenges. Some 29.5% of respondents class the existence of too many silos and an inability to share data between departments as a very significant challenge with a further 49.3% rating this as quite a significant challenge.

**Fig. 31** What do you think are the major challenges to unleashing the potential of data analytics?



1 2 3 4  
 (1 = Very significant challenge, 2 = Quite significant challenge  
 3 = Not very significant challenge, 4 = Not at all a significant challenge)

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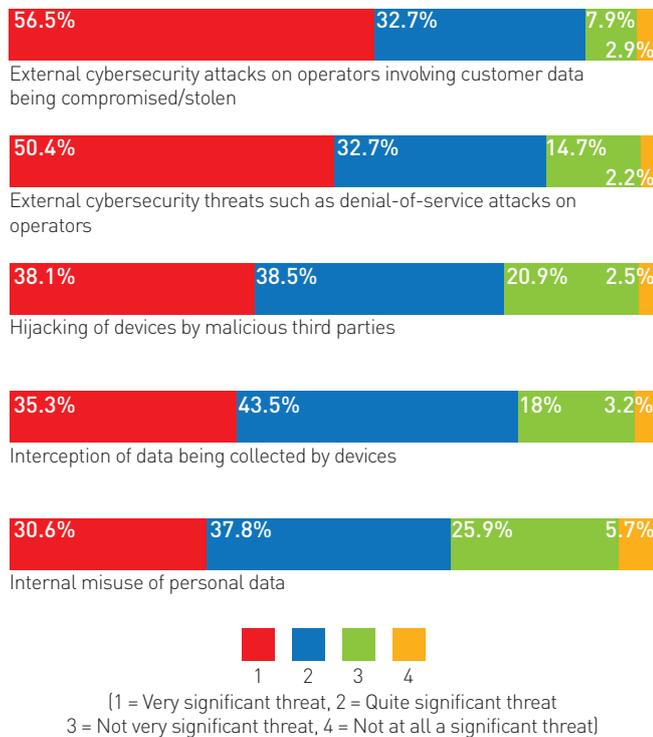


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**Fig. 32** How big a challenge to operators today are the following security threats?



Survey respondents also believe that consumers are unlikely to be convinced that permitting their data to be used could be beneficial to them. Some 32% believe this to be a very significant challenge with a further 44.6% believing it to be quite a significant challenge.

Survey respondents also think that consumer resistance will be fuelled by a perception that their data is used in ways that are advantageous to service providers, rather than them, with a third of respondents believing this to be a very significant challenge.

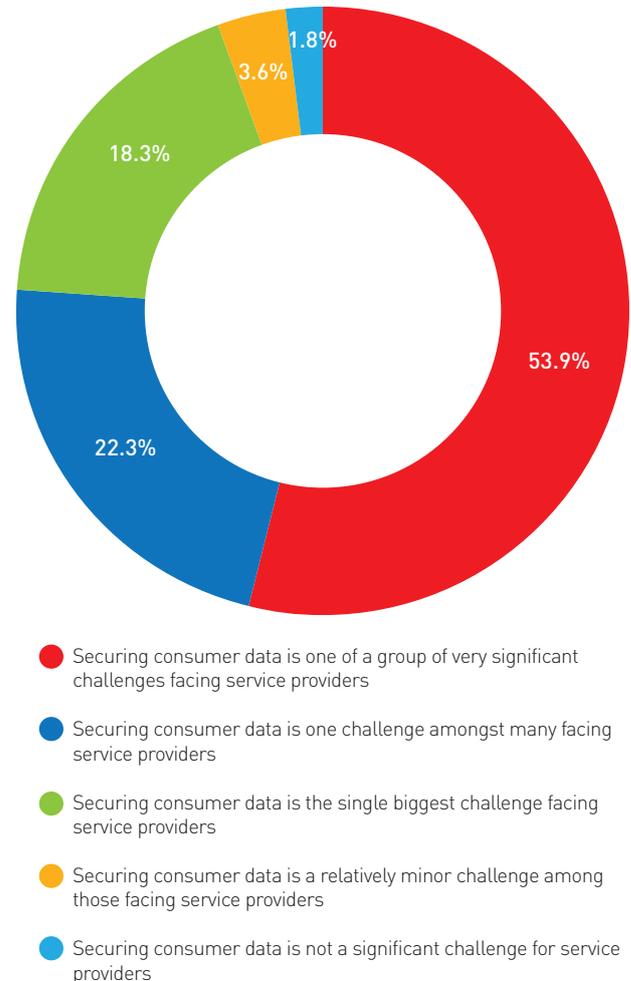
If consumers' perceptions about security are a big issue, our respondents are markedly less worried about service providers' ability to manage sensitive consumer data securely. Some 28.8% believe this will be a very significant challenge, with 45.3% believing it to be quite a significant challenge. Some 26% believe it is either not very significant or not at all significant.

Respondents are also less concerned about the idea that data could produce misleading results because reliable analytic tools are not available. Only 16.5% believe this will be a very significant challenge. However, some 45% believe it could be quite a significant challenge. (Fig.31)

In terms of security, respondents rated external cybersecurity threats as the most important challenge, with 56.5% rating it as a very significant threat and a further 32.7% rating it as moderately significant. The danger of customer data being compromised or stolen is seen as the most serious threat facing service providers.

Respondents also think that other types of cybersecurity threat

**Fig. 33** Which of the following statements best expresses your opinion about the security threats raised by the extensive collection of consumer data by service providers?



such as denial-of-service attacks on operators are a major challenge, with over 50% rating this as a very significant threat.

Device security concerns are rated as a more moderate but still significant threat. A higher proportion of respondents rated interception of data being collected by devices as a moderate threat than believed it was very significant, and the same is true of the hijacking of devices by malicious third parties.

Of less concern – seen as a very significant challenge by only 30.6% of respondents – is internal misuse of personal data by companies. (Fig.32)

Consumer data is clearly the big concern. Asked to express their view of the security threats raised by extensive collection of consumer data, 53.9% of respondents endorsed the view that securing consumer data is one of a group of very significant challenges facing the industry. Some 18.3% believe that securing consumer data is the single biggest challenge facing service providers. (Fig.33)

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## Conclusion

Data analytics is set to have a major impact on the video delivery industry. While a solid minority of respondents to our survey believe this impact will be transformative, a majority believe data analytics will enhance the business of video service providers, albeit in a way that falls short of being 'transformative'.

The key applications that capture the imagination of survey respondents are about analysing consumer behaviour to better inform decisions taken by service providers – especially by deciding how to package and market content and by taking decisions about infrastructure to match the consumption habits of their user base.

Respondents are more sceptical about consumers accepting that service providers' use of data about them will be beneficial to them personally. While consumers are likely to appreciate receiving better content recommendations and search results, they are less likely to embrace targeted advertising.

It is no surprise then that SVOD providers – who generally provide ad-free services but want to present relevant content to their users – are seen as the big winners of the data analytics revolution.

However, advertisers and marketers are also seen as having much to gain, even if consumers don't immediately appreciate their efforts. Multi-play providers are also seen as likely to benefit from the application of data analytics.

One of the factors underlying consumer resistance to service providers gathering and using data about them is a fear about the security of their personal information being compromised. This is seen as the single biggest challenge facing service providers.

If security is a major concern to consumers, it should also be a major concern to operators. The best way to assuage consumer concerns is to ensure that data remains uncompromised.

It is no surprise then that survey respondents view cybersecurity threats as the most important challenge facing service providers, with the danger consumer data being compromised or stolen seen as the most serious risk. ●

# The multiscreen video experience

## Introduction

Providing a more or less equivalent line-up of content across multiple screens inside and outside the home is now an important objective of service providers. Delivering TV to mobile phones, tablets and computers is still seen as primarily related to on-demand consumption, but demand for linear TV on multiple screens is growing and is also increasingly seen as a mainstream service.

Interest in multiscreen delivery is growing against the background perception that TV consumption is declining, at least in relative terms. Operators that have traditionally targeted TV consumption via a set-top box therefore have an existential interest in investing in systems that support delivery to other screens.

For TV operators, multiscreen is an important part of their competitive armoury. It is an application that increases subscriber loyalty. It can increase the reach of the operator outside the home, if rights for out-of-home consumption are available, and it can provide a substitute for the provision of additional set-top boxes within the home.



As technology partner, ZATTOO makes IP-based TV solutions available to network providers, FTTH operators, internet service providers and OTT providers in Europe and the US. The portfolio on offer ranges from backend services (ingest, encoding and transcoding) up to completely hosted and managed end-to-end solutions for first screen IPTV as

well as OTT / TV Everywhere. ZATTOO, the oldest and largest internet TV provider in Europe, has been operating successfully in the B2B marketplace since 2012 and entered the US market recently, proving a TV Everywhere service to Florida based Hotwire Communications. For more information, go to [zattoo.com/solutions](http://zattoo.com/solutions).

# The multiscreen video experience

## TV operators and multiscreen delivery

TV everywhere or multiscreen TV is one of the most important cloud applications to emerge and a key competitive tool for TV service providers.

Our survey respondents keenly believe in the centrality of delivering TV to multiple screens for the future of TV operators' businesses. Some 42.5% agree that TV viewing is rapidly migrating from traditional TV screens to other IP devices and that these devices will actually supersede the TV sooner than expected.

A further 37% agreed that a growing proportion of TV viewing is now on IP-connected devices rather than the TV, and that TV viewing on the main screen is likely to decline slowly over time.

Only a minority of respondents believe that the TV screen will continue to be the preferred option when available, and only 2.9% believe that multiscreen TV viewing will remain a minority pursuit with the TV retaining primacy. (Fig. 34)

Unsurprisingly in the light of these views, smartphones and tablets trump smart TVs and set-top boxes in the list of devices it is important for TV operators to support.

Asked how important they think support for the delivery of content is to a number of categories of device, over two thirds of respondents think that supporting delivery to smartphones is very important, with 23% ranking it as moderately important.

Tablets – often seen as a device category that is in decline – follow close behind, with 61.5% of respondents thinking it is very important to deliver content to these devices, and 27.7% thinking it is moderately important.

By contrast, only some 56.5% of respondents think it is very important for operators to support delivery of content to smart TVs, with a further 27.3% thinking it is moderately important. TV operator-owned set-top boxes follow. Some 46.4% think these devices are very important, with 32% rating them as moderately important.

Smart TVs and set-tops nevertheless come well ahead of streaming devices that are connected to the TV. Google's Chromecast is the top-rated of these, with 37.4% thinking it is very important to support this device and 38.9% thinking it is moderately important. Apple TV and Amazon Fire TV rank more or less equally. Some 38.5% of respondents think Apple TV is very important, with 34.2% rating it as moderately important. For Amazon Fire TV, the figures are 35.2% and 41.4% respectively.

Bottom of the list of IP-connected devices in order of importance, at least in the view of this survey sample, is another TV-connected streaming device, Roku – perhaps something that reflects the geographical bias of respondents. This device is rated very important by 23.7%, moderately important by 41.4% and either not very important or not at all important by a collective 34.9%.

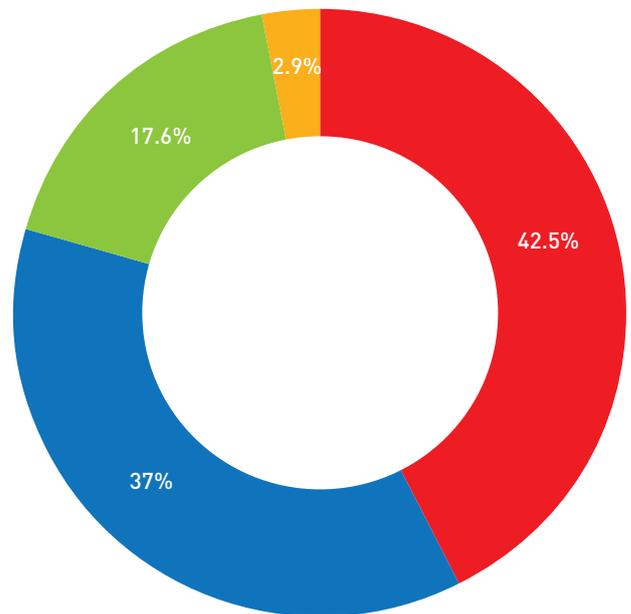
Roku stands side-by-side with game consoles – another device class judged relatively unimportant by respondents – at the bottom of the line-up of devices considered. (Fig. 35)

In terms of the functionality required of multiscreen devices, respondents believe that playback capability, pure and simple, is the key thing. Asked to rate a set of multiscreen applications for their relative importance, our respondents rated app-based catch-up TV and video-on-demand at the top of the list. This application is judged very important by 64.4% and moderately important by 29.9%.

App-based streaming of live TV channels comes next. This is very important for 52.5% of respondents and moderately important for 36%.

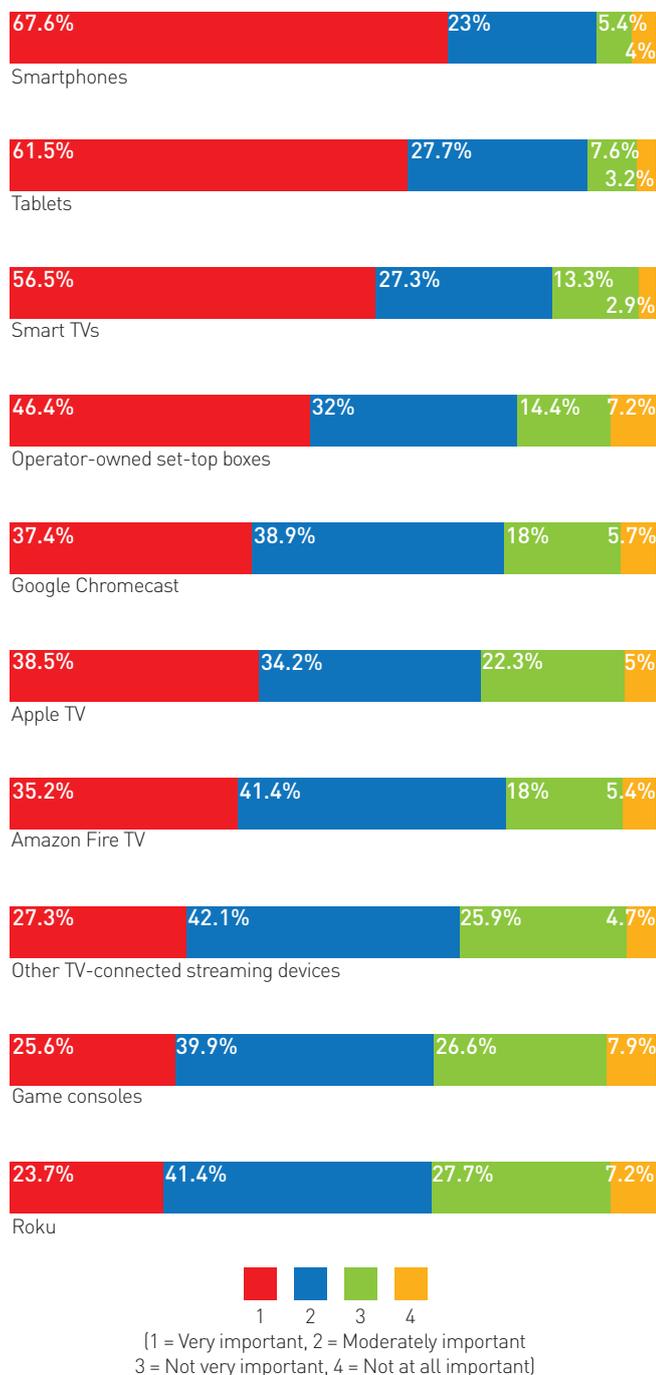
After this, the most important functionality, in the view of survey respondents, is the cross-device integration – for example enabling all

**Fig. 34** Which of the following statements best expresses your opinion about the importance for service providers of delivering TV services to multiple IP-connected screens, rather than the TV alone?



- TV viewing is rapidly migrating from traditional TV screens to other IP-connected devices, especially among younger age groups, and these devices will supersede TV sooner than expected
- A growing proportion of TV viewing is being done on IP-connected devices rather than the main TV screen, and TV viewing on the main screen is likely to decline slowly over time
- There is more viewing of TV on IP-connected devices rather than the main TV, but the main screen will still be the preferred option when it is available
- TV viewing on IP-connected devices other than the main screen will remain a minority pursuit and the main TV will retain primacy in the home

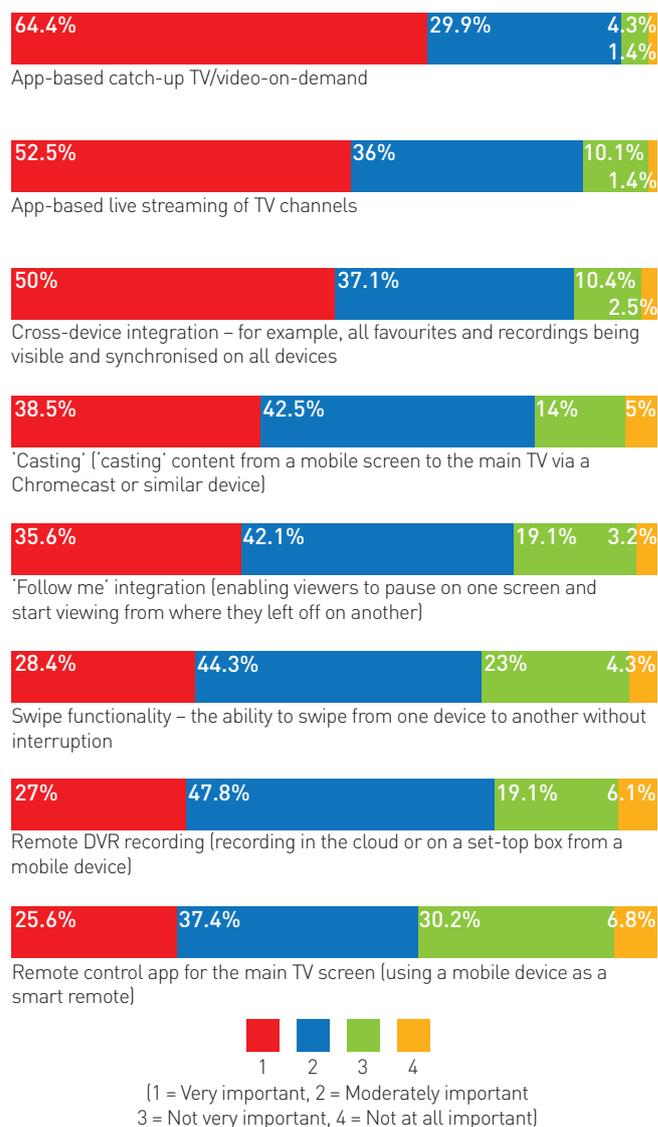
**Fig. 35** How important do you think it is for TV operators to support delivery of content to the following devices?



favourites and recordings to be visible and synchronised on all devices.

Other applications could be considered as subsets of cross-device integration. Casting – mirroring content present on a mobile screen on the main TV screen via a device such as Chromecast HDMI stick – is seen as very important by 38.5% and moderately important by 42.5%.

**Fig. 36** Which of the following multiscreen applications do you think TV operators need to support as a matter of priority?



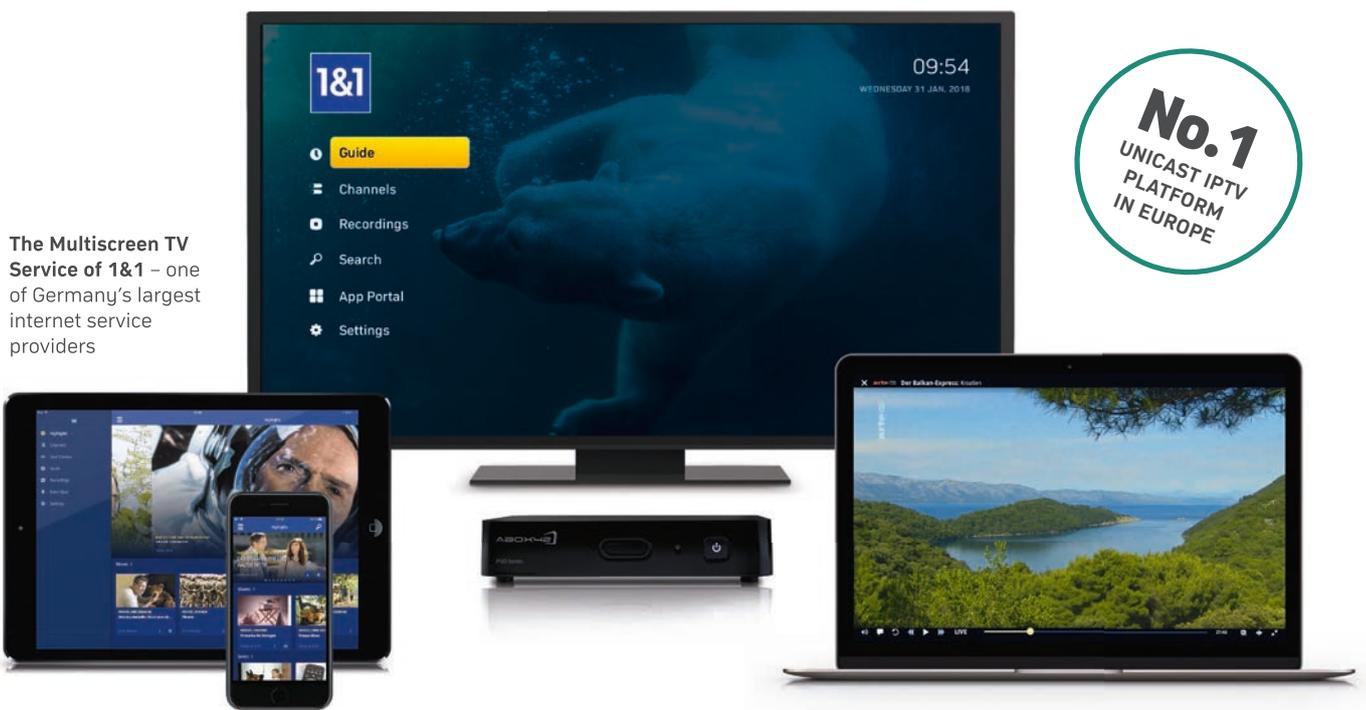
'Follow-me'-type integration, where viewers can pause a piece of content on one screen and take up viewing of it on another screen, is also considered quite valuable, with 35.6% rating this as very important and 42.1% rating it as moderately important.

Further down the list of priorities are swipe functionality – the ability to 'swipe' content from one screen to another without interruption – is considered very important by 28.4% and moderately important by 44.3%. Remote DVR capability – the ability to set a recording in the cloud or on a set-top box from a mobile device – is very important for 27% and moderately important for 47.8%.

Bottom of the list of apps considered in order of importance is the use of the mobile device as a remote control for the main screen in

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the home. This is considered either not very important or not at all important by a total of 37% of respondents, and as very important by only about one in four. (Fig. 36)

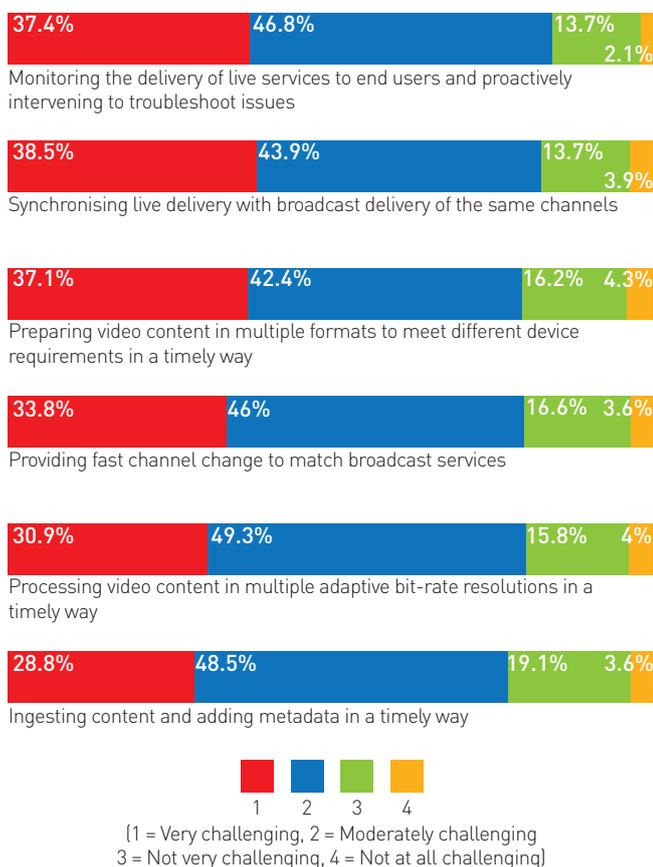
## Challenges and opportunities

The distribution of live-streams to phones and tablets has captured significant attention over the last year, given the rise of platforms including Facebook Live.

We asked survey respondents to assess some of the challenges of delivering live content as part of a multiscreen experience. While multiscreen delivery of content is not without its technical complexity, particularly in the case of live content, none of the challenges considered registered any major surprises. Top of the list was the need to monitor the delivery of services to end-users and proactively intervene to troubleshoot issues. This was seen as very challenging by 37.4% and moderately challenging by 46.8%.

Next on the list of key challenges is the need to synchronise live delivery with broadcast delivery of the same channels – avoiding the

**Fig. 37** What are the major challenges TV operators face in integrating live TV services as part of their multiscreen offering?



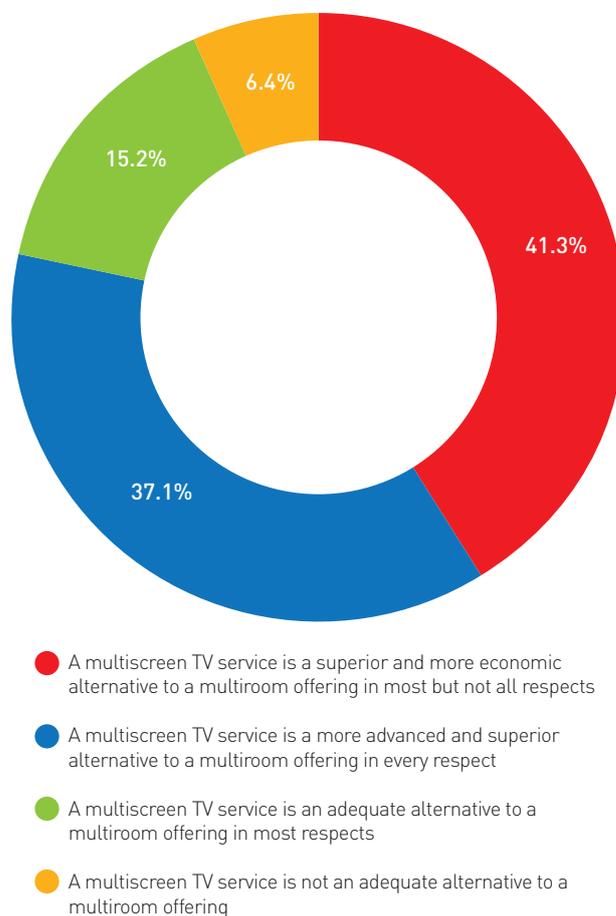
much-discussed problem of hearing your neighbours shout ‘goal’ moments before you see the event. This is considered very challenging by 38.5% and moderately challenging by 43.9%

The need to prepare video content in multiple formats to meet the requirements of multiple devices also ranks quite highly. Some 37.1% of respondents considered this to be very challenging and a further 42.4% consider it to be moderately challenging.

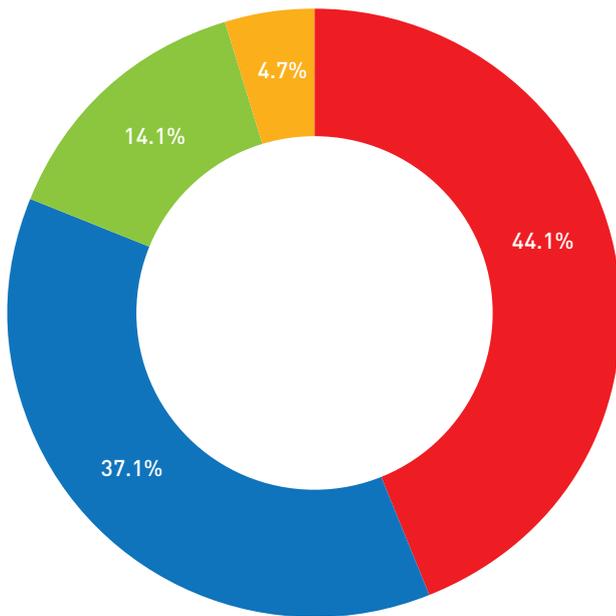
Other requirements – providing fast channel change to match broadcast, processing video in multiple adaptive bit-rate formats in a timely way, and ingesting content and adding metadata in a timely way – are broadly seen as moderately challenging. (Fig. 37)

One potential application of multiscreen distribution for service providers themselves is to employ it as a substitute for ‘multiroom’ services. Historically, pay TV operators have provided this as premium service, supplying additional set-top boxes to existing subscribers to enable them to receive their service via TV screens in different rooms in their home. This involves a capital expense for the operator. However,

**Fig. 38** Which of the following statements best expresses your opinion about the use of multiscreen distribution as an alternative for a ‘multiroom’ service (i.e. supplying two or more set-top boxes to subscribers to enable distribution to multiple TVs in a home)?



**Fig. 39** Which of the following statements best expresses your opinion about whether operators should provide adaptive bit-rate (ABR) unicast IPbased multiscreen delivery alongside broadcast/multicast-based delivery of linear channels to TV screens (hybrid delivery) or ABR IP delivery to all screens (IP-only)?



- Hybrid delivery, using IP to deliver to multiscreen devices and broadcast/multicast technology to deliver to the TV, combines the best of both worlds and is the best choice for service providers
- Hybrid delivery involves some inefficiencies but is, on balance, more economic and a better solution than all IP delivery
- IP-only delivery involves some inefficiencies but is, on balance, more economic and a better solution than hybrid delivery
- IP-only delivery is inherently superior to hybrid delivery

if consumers are willing – or prefer – to use smart TVs, retail streaming devices or mobile devices to view content outside the living room, IP-based simulcast of the pay TV service could provide a low-cost alternative to provisioning additional set-tops.

The majority of survey respondents who expressed an opinion view multiscreen TV as a viable alternative to multiroom offerings. Some 37.1% of respondents believe multiscreen is a more advanced or

superior alternative to multiroom in all respects, while 41.3% believe it is a superior and more economic alternative in most respects.

A smaller proportion – 15.2% - believe multiscreen is an ‘adequate’ alternative to multiroom in most respects. Only 6.4% reject multiscreen as a choice, endorsing the view that is not an adequate alternative to a multiscreen offering. (Fig. 38)

We also asked survey respondents whether it makes sense to employ hybrid delivery of content – using broadcast technology to deliver content to TVs combined with adaptive bit-rate IP-based delivery to other screens – or whether it makes more sense to use IP for all screens.

The vast majority of respondents who expressed a view are in favour of hybrid delivery. Some 44.1% agree that hybrid delivery, using IP to deliver to multiscreen devices and broadcast/multicast technology to deliver to the TV, combines the best of both worlds and is the best choice for service providers. A further 37.1% endorse the view that hybrid delivery involves some inefficiency but is, on balance, more economic and a better solution than all IP delivery.

Only a minority is in favour of all-IP delivery. Only 14.1% endorse the view that IP-only delivery involves some inefficiency but is, on balance, more economic and a better solution than hybrid delivery, while only 4.7% say that IP-only delivery is inherently superior to hybrid delivery. (Fig. 39)

For service providers, delivering a multiscreen TV service is increasingly a crucial part of their toolset to win and keep subscribers. Asked to rate the major benefits of providing a multiscreen service, survey respondents were particularly enthusiastic about the ability of multiscreen offering to help service providers retain customers and reduce churn. Some 56.1% said this provided a very significant benefit to service providers, with a further 34.5% saying it provided a moderately significant benefit.

The other key – related – benefit of multiscreen, in the view of respondents, is that it enables service providers to extend their hold on subscribers’ attention by enabling them to view content outside the home. This is seen as a very significant benefit by 47.1% and a moderately significant benefit by 38.9%.

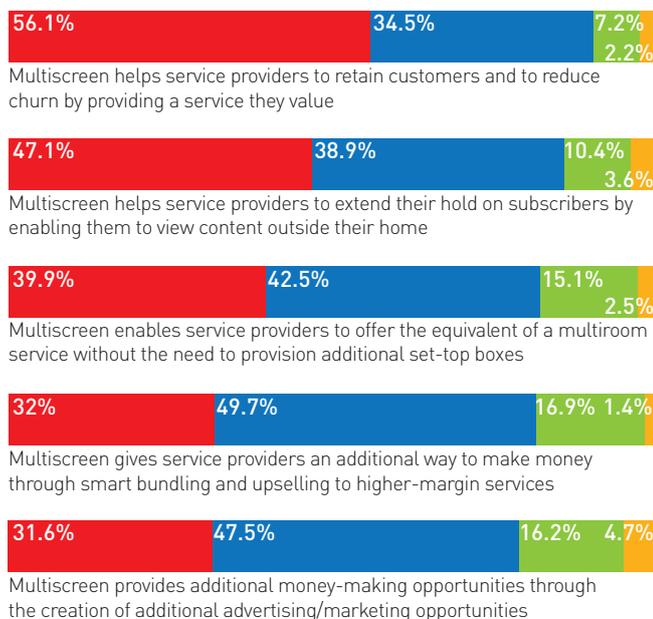
Respondents perceive other benefits to be more moderate. The fact that multiscreen enables service providers to offer a multiroom service without investing in additional set-top boxes is seen as very significant by 39.9% and moderately significant by 42.5%.

The monetisation opportunities afforded by multiscreen are slightly more marginal. Multiscreen providing additional ways to make money through smart bundling and upselling to higher marginal services is seen as very significant by 32% and moderately significant by 49.7%, while the ability of multiscreen to provide additional advertising and marketing inventory and opportunities is seen as very significant by 31.6% and moderately significant by 47.5%. (Fig. 40)

**56%**

believe multiscreen is very significant in helping operators retain customers

**Fig. 40** What are the major benefits of delivering a multiscreen service from the point of view of service providers?



{1 = Very significant benefit, 2 = Moderately significant benefit  
3 = Not very significant benefit, 4 = Not at all a significant benefit}

## Conclusion

The ongoing acceleration of viewing of content on mobile devices is concentrating minds within the industry. Industry executives perceive that viewing of content on the main TV is likely to decline over time as a proportion of overall consumption of content within the home.

The proportional decline in TV viewing is of course in part related to the fragmentation of viewing at the level of individual households and growth in consumption of new content categories such as YouTube content rather than to a decline in TV viewing per se, but the respondents to this survey are nevertheless firmly of the view that TV viewing is going to decline in relative terms, with few believing the big screen will retain primacy.

Given the overall penetration of smartphones, it is no surprise that respondents believe it is very important to deliver content offerings to these devices. But while smartphones are the prime device, respondents also believe that it is important to support delivery of content to smart TVs and other TV-connected devices other than the main TV tethered to a set-top.

The key multiscreen application, as far as service providers are concerned, is playback of the same line-up of content that is available elsewhere rather than other forms of enhanced functionality such as using the device as a remote control. The ability to use a device to view on-demand and catch-up content is crucial, but delivery of live TV services via mobile apps is also seen as highly important.

Delivering live content to IP-connected devices can be challenging, but for survey respondents these challenges can broadly speaking be overcome. The most important is the need to adequately monitor and troubleshoot service delivery to end users. Synchronization with broadcast streams is also challenging and an increasingly important feature of multiscreen TV.

Survey respondents are in favour of using hybrid delivery – with broadcast streams delivered to the TV and IP streams delivered to other devices – as the most efficient way to provision a multiscreen TV service.

Multiscreen delivery outside the home can help operators extend their reach and compete more effectively. The key benefit of multiscreen for service providers is to help them retain customers and reduce churn. ●

# Multiscreen distribution and service provider WiFi

## Introduction

Consumers are no longer content to pay for a TV service package that they can only view on a TV connected to a set-top box.

The growing use of mobile devices, in some cases as the primary viewing device, means that service providers need to support multiscreen delivery in order to satisfy their user base.

That means investing in in-home networks. If operators have sometimes regarded in-home WiFi as an afterthought, this is a luxury they will not be able to afford as growth in mobile video consumption accelerates. Consumers increasingly expect to be able to view content seamlessly on TV, mobile devices and PCs without interruption.

The challenge presented by the explosion in multiscreen video consumption will be exacerbated by growth in demand for UHD video and, possibly, by virtual reality and other bandwidth-hungry applications.

Operators must therefore take in-home networking – and WiFi in particular – more seriously than ever if they want to ensure that customers remain satisfied with the level of service they provide.



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# Multiscreen distribution and service provider WiFi

## TV everywhere and its challenges

Growth in mobile video consumption means that the ability to offer TV everywhere could soon emerge as the most important element in the TV service provider's arsenal of tools to fight off the competition.

That at least appears to be the view of a substantial number of respondents to this survey. Asked to assess the importance of multiscreen video distribution, three in 10 survey respondents say that delivering video to any screen is the single most important application that TV operators must support. A further 55.4% say that it is one of the most important. Only a tiny minority – 2.5% – believe that delivering video to any screen is not particularly important relative to other applications. (Fig. 41)

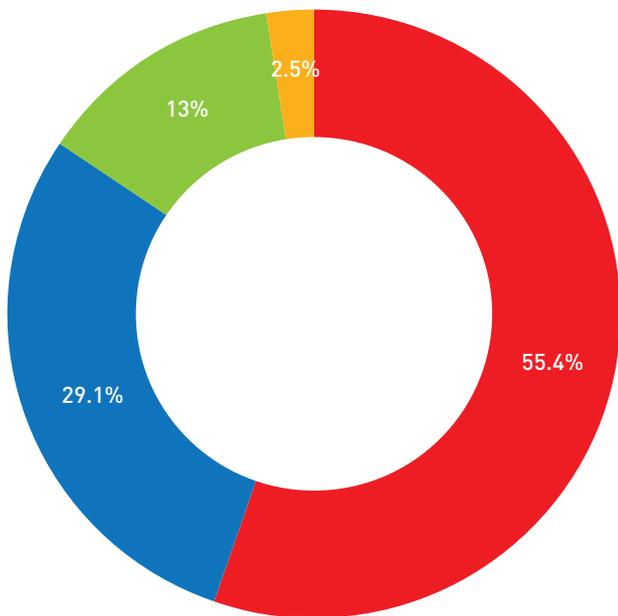
Delivering video services – including live services – over unmanaged

networks is not without its challenges. While service providers can do things to ensure delivery of video services in high quality to the set-top boxes in the home, ensuring the same quality on other devices generally means relying on in-home networks over which they have less control.

While operators may be able to manage quality-assured delivery of video services to one or two devices simultaneously, things may become markedly trickier if, as expected, video consumption on mobile devices – including consumption of higher-resolution streams – grows exponentially.

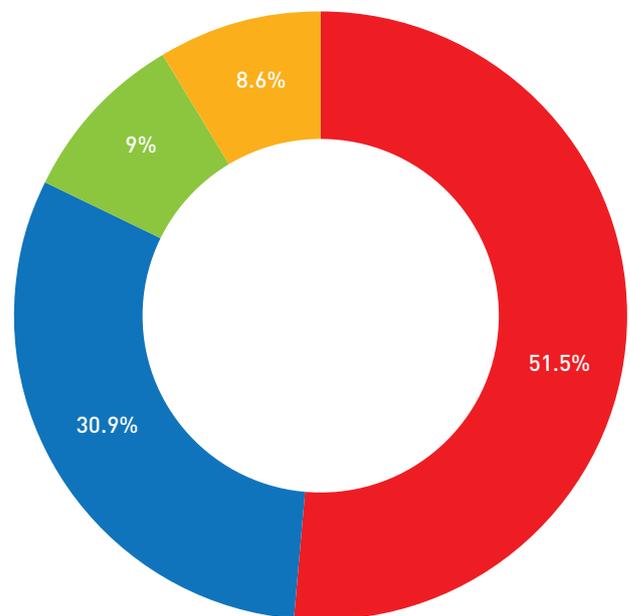
Asked to assess the relative importance of four key home-video consumption trends in terms of the difficulty they pose to operators, well over half of our survey respondents – 51.5% – say that the ongoing growth in the number of simultaneous streams delivered to each individual home is the biggest challenge.

**Fig. 41** Which of the following statements best expresses your opinion about how important it is for pay TV operators to support multiscreen video distribution?



- The distribution of video to any screen is one of a group of important applications that TV operators must support
- The distribution of video to any screen is the single most important application that TV operators must support
- The distribution of video to any screen is important, but not as important as a number of other applications that TV operators must support
- The distribution of video to any screen is not very important compared with other applications that TV operators must support

**Fig. 42** Which of the following trends do you think will provide the biggest challenge to operators delivering seamless multiscreen distribution of content over the next five years?



- The ongoing growth in the number of simultaneous streams delivered to each individual home
- The adoption of 4K and ultimately 8K UHD resolution as the standard for video streams
- The emergence of VR as a mainstream technology for gaming and entertainment
- Growth in the number of wirelessly connected 4K and 8K TVs and other screens within the home

The second most-important challenge, in the view of survey respondents, is the adoption of 4K and ultimately 8K UHD resolution as the standard for mainstream services.

Other key trends are seen as markedly less significant. Only 9% of respondents believe that the emergence of VR as a mainstream technology for gaming and entertainment services will emerge as the biggest single challenge. A similar number believe that growth in the number of wirelessly connected 4K and 8K TVs and other screens within the home will be the most significant factor. (Fig. 42)

However, while virtual reality is seen as less significant a threat than the delivery of multiple simultaneous streams, VR comes at the top of the list of types of content that respondents believe operators will find hard to deliver if and when it becomes more mainstream.

Asked to rate six types of content by difficulty in distributing over in-home networks to multiple screens, over four in 10 respondents rated VR and mixed reality as highly challenging and a further four in 10 rated it as moderately challenging.

VR is ranked roughly equal with 4K UHD TV in terms of the challenge it poses to service providers. Just over four in 10 respondents rated 4K UHD TV as highly challenging, with 37.8% rating it as moderately challenging.

360° video – a close relative of VR – was rated highly challenging by just over a third of respondents and moderately challenging by 43.2%.

Less of a problem, in the view of respondents, is massive multiplayer gaming, ranked as moderately challenging by just over 50%, highly challenging by 20.9% and not very challenging by 24.4%.

On-demand video in multiple resolutions for multiple devices is seen as highly challenging by 19.8%, moderately challenging by 37.8%, not very challenging by 29.8% and not at all challenging by 12.6% of respondents.

Least challenging of all, in the view of survey respondents, is user-generated video. Despite the proliferation of live-streaming of UGC, the fact that such streams are not seen as premium possibly plays a role here. UGC is seen as highly challenging by only 7.6% of respondents. It is seen as either not very challenging or not at all challenging by 55%.

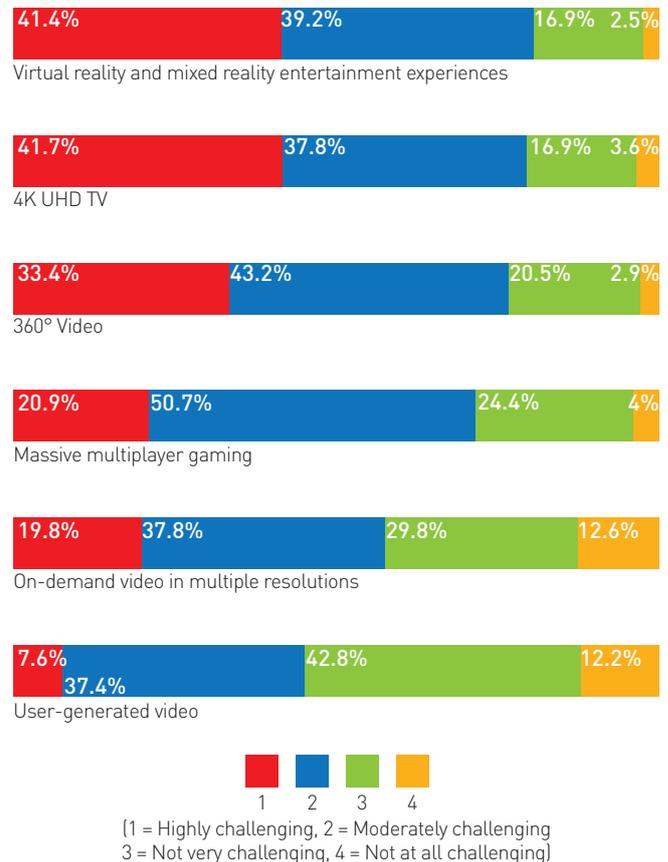
(Fig. 43)

Drilling deeper, we asked survey respondents to express a view on the nature of the challenges faced by operators in supporting these applications.

Here, providing adequate bandwidth to support multiple simultaneous streams of high-resolution video is seen as the critical challenge, ranked as very significant by 57.9% of respondents.

Providing adequate WiFi coverage within the home to support simultaneous delivery of multiple high-resolution streams is also

**Fig. 43** How challenging do you think operators will find it to support in-home multiscreen distribution of the following types of content as these grow in popularity?



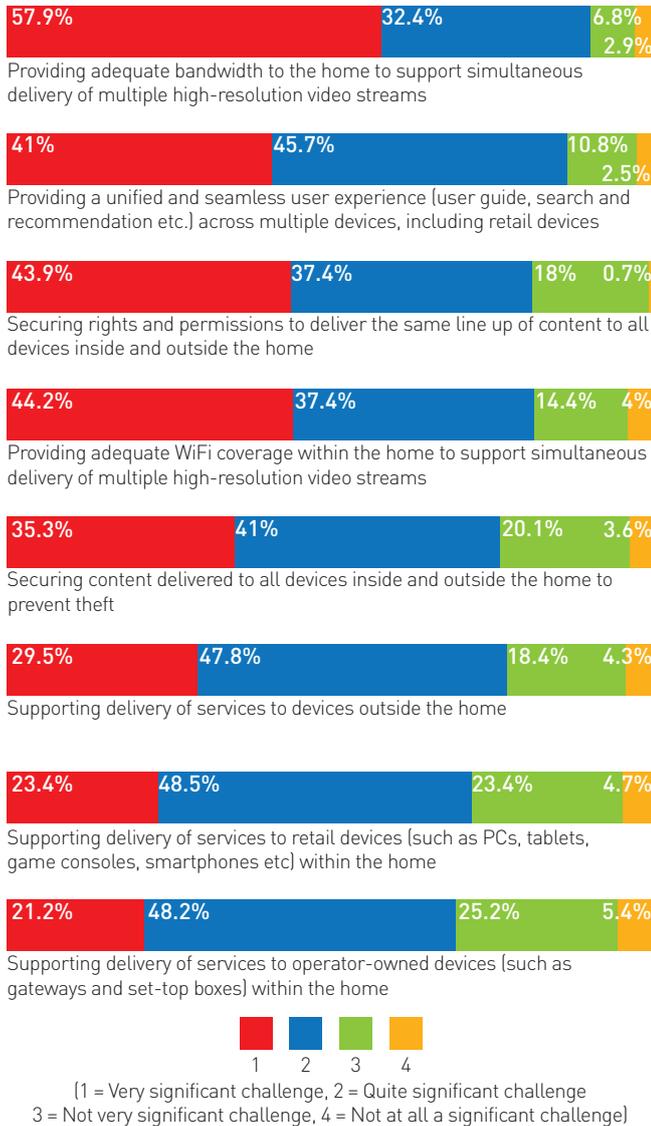
ranked highly, seen as a very significant challenge by 44.2% and as a moderately significant challenge by 37.4%.

Other factors seen as significant include the non-technical challenge of securing rights and permissions to deliver the same line-up of content to all devices inside and outside the home, seen as very significant by 43.9% and moderately significant by 37.4%, and the need to provide a unified and seamless user experience across devices. The latter is seen as very significant by 41% and moderately significant by 45.7% of respondents.

51%

believe WiFi is the most important in-home networking technology for video

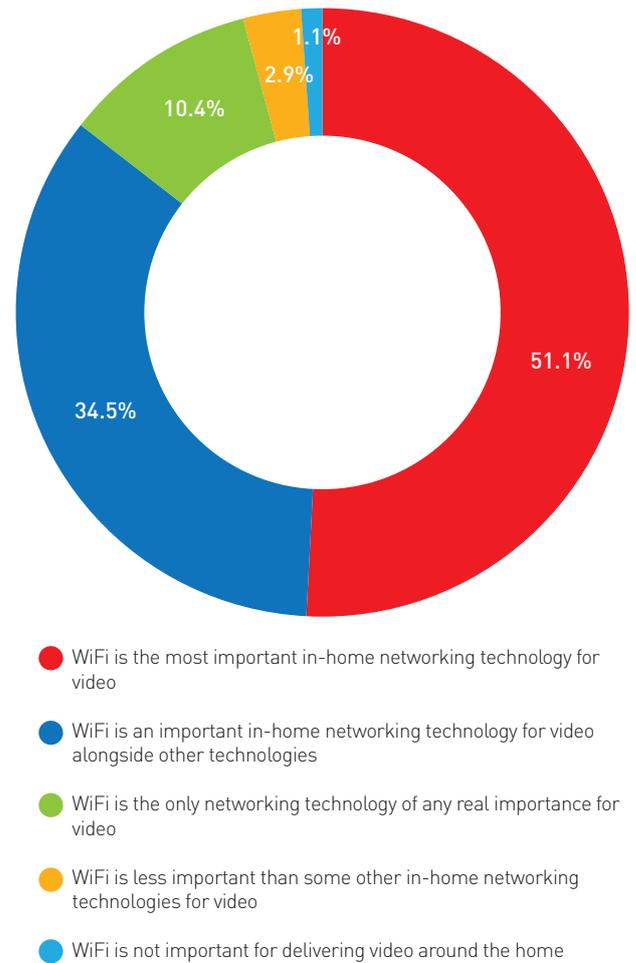
**Fig. 44** What are the most important challenges currently faced by operators in supporting multiscreen distribution of video services?



Challenges of middling significance, in the view of respondents, include the need to support delivery of services to devices outside the home and the need to secure content delivered to all devices.

Factors that are seen as not particularly challenging include the need to support delivery of services to consumer retail devices, such as PCs, tablets and games consoles, and the need to support delivery of services to operator-owned devices such as gateways and set-tops. While the latter is seen as the least challenging element among the seven considered, there is relatively little to choose between supporting retail devices and operator-owned devices, in the view of survey respondents. (Fig. 44)

**Fig. 45** Which of the following statements best expresses your opinion about the importance of WiFi in delivering video services to multiple screens compared with alternative infrastructure choices?



## WiFi and multiscreen distribution

WiFi is the primary technology choice for delivering video services to multiple devices, and this is clearly recognised by our survey respondents. Over half of respondents endorse the view that WiFi is the most important in-home networking technology for video and a further 10.4% endorse the view that WiFi is the only networking technology of any real importance for video. Only a small minority believe that WiFi is less important than other networking technologies. (Fig. 45)

Opinions are more nuanced, however, when it comes to considering the extent to which operators need to invest in upgrading in-home WiFi. Here, respondents are more or less equally divided between those who think that operators either do not need to invest further or need to invest further in only a limited way, and those who think that major upgrades to in-home networks will be required.

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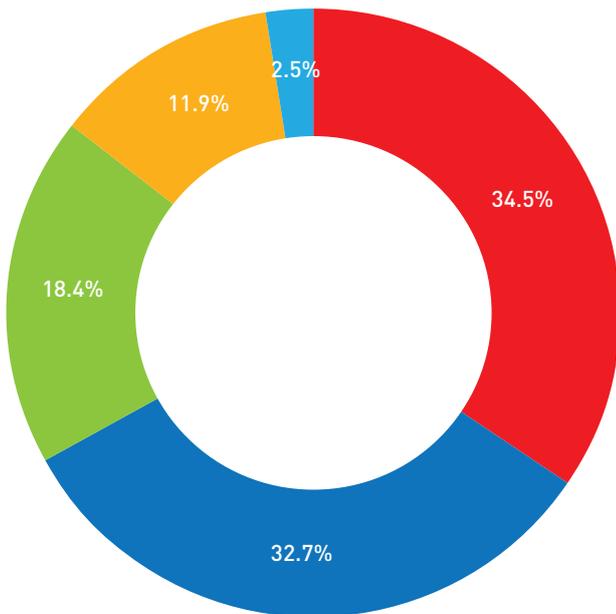


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**Fig. 46** Which of the following statements best expresses your opinion about the best strategy for service providers to ensure that the WiFi in-home networks they provide continue to meet the needs of subscribers over the next few years?

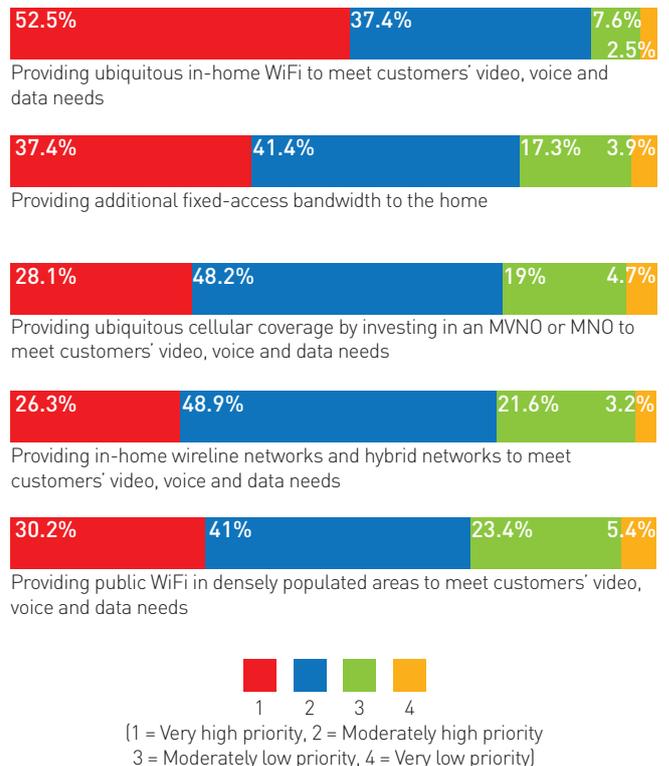


- Operators will need to upgrade in-home WiFi networks to the latest standards to meet customers' needs, but nothing beyond that
- Operators will need to invest further in WiFi, including upgrading to the latest standards and installing new access points to meet customers' needs
- Operators will need to invest not only in the latest WiFi solutions, but also in hybrid solutions (such as by using MoCA, Powerline etc alongside WiFi) to meet customers' needs
- Current in-home WiFi networks supported by operators are adequate to meet customers' needs, and there is no need to invest in new solutions or equipment
- Operators will not be able to meet customers' needs because these will outpace any investment they are likely to be in a position to make

At one end of the spectrum, 11.9% believe that current in-home WiFi networks are adequate, and that there is no need to invest in new equipment. The largest segment, 34.5%, believe that operators will need to upgrade in-home WiFi networks to the latest standards, but that nothing further will be required beyond that.

A more concerned group of 32.7% respondents believe that operators will need to invest further in WiFi, including upgrading to the latest standards and installing new access points to meet customers' needs. Some 18.4% go a step further and endorse the view that they will need to invest not only in the latest WiFi solutions, but also in hybrid solutions,

**Fig. 47** Which of the following areas do you believe converged service providers should prioritise for investment?



such as by using MoCA or Powerline alongside WiFi, to meet customers' needs. Beyond this point, a small number of respondents – 2.5% – believe that operators will simply not be able to meet customers' needs because demand for in-home capacity will outpace any investment they are likely to be in a position to make. (Fig. 46)

Given the relative weight of concern about the looming in-home bottleneck that could result from inadequate WiFi provision, it is no surprise that providing ubiquitous in-home WiFi that is adequate to meet customers' needs comes top of the list of investment priorities favoured by survey respondents.

Asked which areas service providers should focus on, some 52.5% or respondents said that the provision of ubiquitous in-home WiFi to meet customers' video, voice and data needs merited a very high priority, with a further 37.4% saying it should be a moderately high priority. This makes investment in home WiFi far and away the most important priority for operators in the view of survey respondents.

Providing additional fixed-access bandwidth to the home is the second most-important priority identified by respondents, with 37.4% saying this should be a very high priority.

The other investment priorities considered, in order of importance in the view of respondents, were providing ubiquitous cellular coverage by investing in an MVNO or MNO, providing in-home wireline connectivity and hybrid WiFi-wireline networks, and investing in public WiFi. (Fig. 47)

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## Conclusion

The ever-accelerating growth in consumption of video on multiple screens means that it is imperative for service providers to have the ability to deliver video ubiquitously in the home.

Providing a high-quality TV everywhere solution is seen as a competitive necessity for operators, with many industry figures identifying this as their number one priority.

The explosion in IP video consumption means that more bandwidth will be necessary to deliver video seamlessly to all points of consumption. In the view of survey respondents, growth in the number of simultaneous streams delivered to individual homes represents the biggest single challenge facing operators, followed closely by the expectation that those streams will increasingly be high-resolution streams, including 4K or even 8K UHD.

More simultaneous, high-resolution streams means that operators need to provide more bandwidth not only to the home but within it. This means investing in WiFi. WiFi is the primary choice for transporting video services around the home and operators need to ensure that WiFi coverage will be accurate. Many industry figures are convinced that operators will need to invest heavily in in-home networking, though a substantial minority still believe that operators will not need to invest significantly in next-generation networking technology.

There is, however, a consensus that investing in WiFi will be the number one networking priority for operators as they seek to future-proof their consumer offerings. ●

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