

The future of mobile video



Introduction

Cartesian's mobile video report, in collaboration with *Mobile World Live*, provides an in-depth analysis into current and future trends of smartphone video consumption, currently the biggest traffic driver on today's mobile and Wi-Fi networks.

As indicated by a range of studies and industry experts, the pace of mobile video growth will not slow anytime soon, with faster and more efficient networks enabling even more seamless access to mobile video, while growing consumer appetite for user-generated live content and video on-demand is real, and quickly becoming mainstream for younger demographics.

This analysis, which surveyed players across the mobile ecosystem, has enabled a wider understanding into what types of companies will emerge at the forefront of future mobile video developments, as well as identifying trends, and the prevailing devices and technologies expected to improve mobile video quality and consumption both inside and outside the home.

The study is split into five key topic areas: device preferences for video, smartphone video content trends inside and outside the home, barriers to using smartphones for video, mobile video access, and the role of industry stakeholders.

Through the survey, this study has garnered opinion from operators, vendors, MVNOs and mobile video service providers, providing an insight into future consumer and business trends expected to be shaped by the mobile video phenomena.

Survey overview

With responses coming far and wide, from Afghanistan to Brazil, this report takes into account the views of 370 industry leaders on mobile video.

The largest segment of responses came from mobile operators at 22 per cent, while just under 20 per cent were from network equipment vendors.

Respondents from MVNOs, video service providers, mobile device manufacturers, as well as analyst firms, consultancies, financial institutions and media players responded to the survey, showcasing the wide range of interest surrounding mobile video.

DEVICE PREFERENCES



TVs and smartphones

Many of the innovations in video coming to the fore in recent years could only have been possible with the smartphone.

Apple recently hailed 10 years since it introduced the iconic iPhone to the market, and estimates suggest there are now 2.6 billion smartphone users in the world, with that number ever growing.

But while projections about the potential of mobile video continue to sky rocket, today it is still the age-old television that is considered king when it comes to accessing video content inside the home.

Television was listed as the top way for watching content inside the home, securing half of the total responses (50 per cent) when asked to rank devices

used. Video viewing on smartphones, however, is catching up. Overall, smartphones ranked second as the primary way to consume video in the home, which could be considered a direct effect of the screens on these devices getting bigger and better, as well as the maturity of the smartphone market. The respondents put the smartphone ahead of a laptop or PC, which is still considered a more favourable way to access mobile video compared to a tablet.

Although respondents worldwide were aligned in many of their views of the market, the study revealed a notable difference in opinion between respondents in the developed and developing countries, when it comes to device preferences for watching video inside the home.

In developing markets, smartphones ranked as the number one device in the home for video viewing for 35 per cent of respondents. This was followed closely

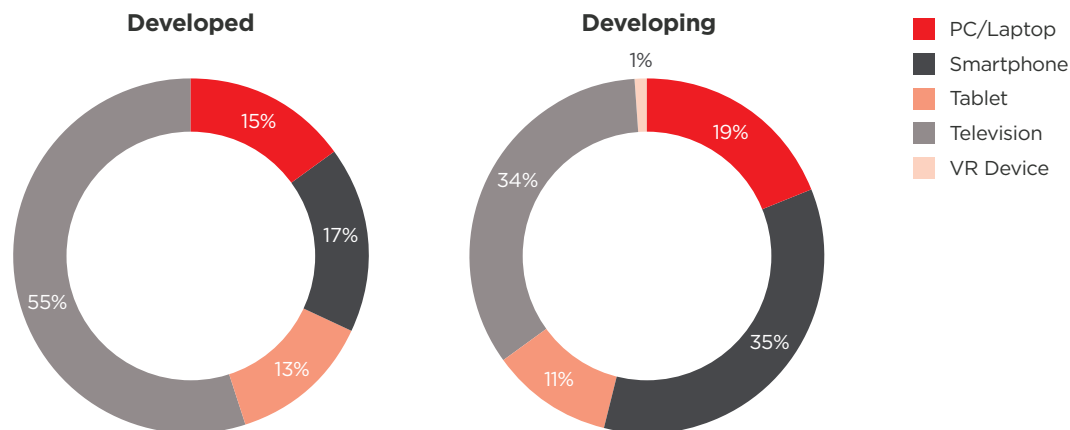
by television, then PC/laptop, tablet, and VR devices trailed far behind.

Across all countries, the majority (82 per cent) of respondents agree that smartphone video watching in the home will increase over the next 5 years, with no significant change in the role of television in the home.

These findings add fuel to the fire that people are using their phones increasingly inside the home to watch content, in preference over other devices that would previously have been used, such as laptops and PCs and in some cases TVs.

A mobile phone, clearly, is no longer only used on the go and its role in the home for video is set expand.

Screen ranked number one in terms of time spent watching video inside the home in 2016



“35% of respondents rank the SMARTPHONE as the top device for viewing video content in the home in developing markets.”

“20% of respondents believe the amount of time spent watching video on VR devices will increase significantly over the next five years, while 34% tip it to increase slightly.”

VR struggling to gain traction

Despite the growing hype about the future potential of the technology, 91 per cent of those surveyed ranked virtual reality as least popular.

In this context, it is important to remember that VR is still thought of as a technology for the future, and it arguably has not yet entered the consumer mainstream.

To change that, a number of the large device manufacturers are plunging big bucks into their own VR offerings, while publishers are also developing VR-oriented content.

In terms of applications, VR is tipped by many to have a big impact not only in the gaming market, which saw its biggest development to date after Sony launched

PlayStation VR late last year, but to also transform the way the television and movie industries produce content.

Top technology firms, including Google and Facebook's Oculus, recently launched the Global Virtual Reality Association (GVRA), along with other players, to promote development and adoption of the technology.

And device maker HTC went as far as brazenly predicting the VR market will overtake the smartphone market in a matter of four years.

While that remains to be seen, this study shows that there is more confidence about the potential of VR up to 2022.

20 per cent of respondents believe the amount of time spent watching video on the devices will “increase significantly” over the next five years, while 34 per cent tip it to “increase slightly”.



SMARTPHONE VIDEO CONTENT



The rise of VOD on smartphones in the home

With smartphones growing in popularity for video content viewing, what do people watch? In this survey, with regards to actual content, the growing popularity of on-demand services on smartphones was clear.

Video on-demand (VOD) content was considered most popular by 29 per cent of respondents, just ahead of on-demand professional short video, such as adverts and music videos.

VOD is certainly on the up, and some major video publishers and technology companies, like Amazon

with Prime video and Netflix of course, have rolled out dedicated services providing original content.

According to a 2016 VOD survey conducted by ratings agency Nielsen, 65 per cent of global respondents said they watch some form of VOD programming, which includes long and short form content. 77 per cent of those respondents said they do so because it allows them to view content at a time convenient to them, further indicating a reason why the traditional form of watching TV is on the decline.

To that point, this study found that just over 8 per cent of respondents rank linear broadcast TV and events as the most popular content type when watching video on a smartphone, while 32 per cent considered it least popular.

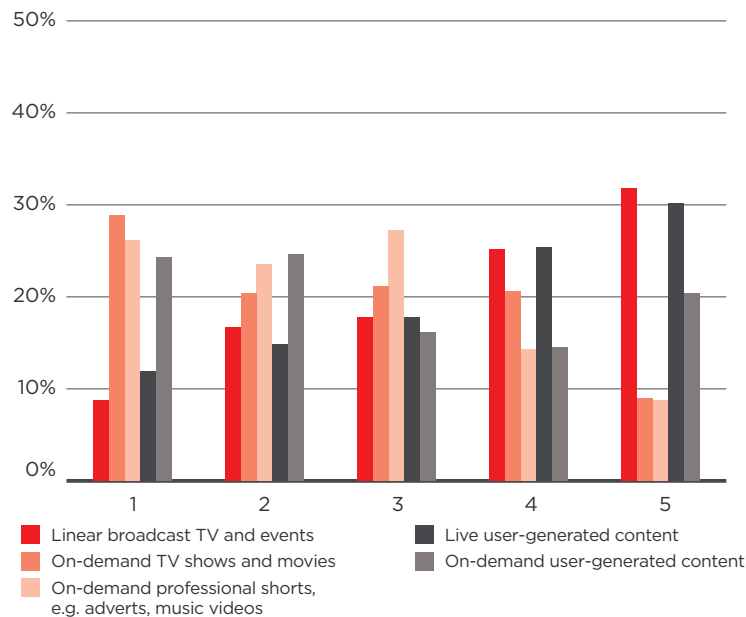
On-demand user-generated content, published on social media for example, ranked above linear in terms of popularity (24 per cent), while live user-generated content, perhaps given its infancy, only resonated with 11 per cent of respondents.

VOD movies and shows are also expected to ensure the popularity of mobile video in the future.

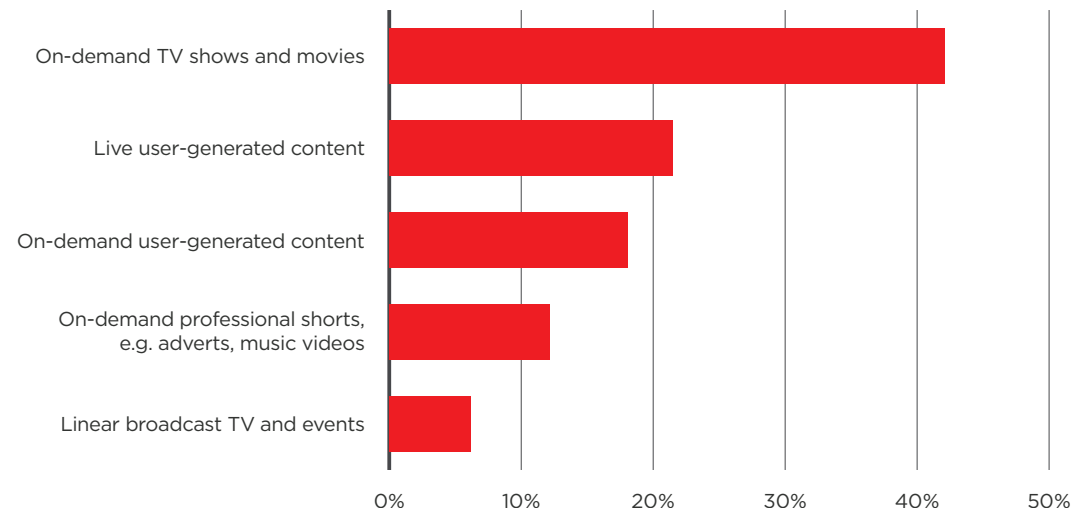
By 2022, 43 per cent of respondents expect that on-demand TV shows and movies viewed on smartphones will see the most growth.

In comparison, only 6 per cent expect linear broadcast to see the most growth inside the home.

Thinking about 2016, what are the most popular content types to view on a smartphone when inside the home? (Ranked 1-5)



Still thinking about smartphone viewing when inside the home, which of the following content types will see most growth over the next five years?



On-demand reigns outside the home

When it comes to smartphone video consumption on the move, respondents' opinions, on the likely trends expected over the next five years, are strikingly similar to smartphone usage in the home.

On-demand TV shows and movies are today also considered to be the most popular types of content to view on a smartphone while on the move. User-generated content, meanwhile, whether live or on-demand, is likely to be more popular with people on the move, compared with inside the home.

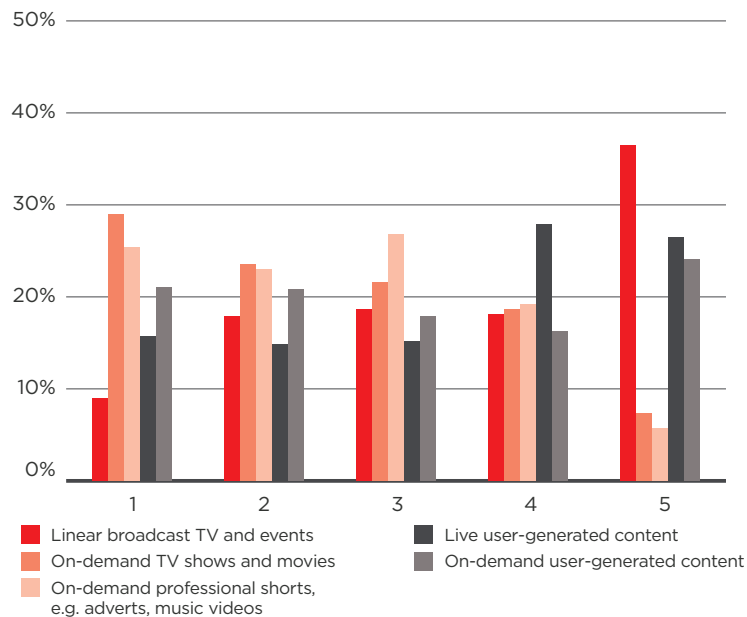
29 per cent ranked on-demand as the most popular content to access while out of the house, and on-demand user-generated content was ranked most popular by 20 per cent.

Linear broadcast TV channel content ranked lowest out of all the category types (9 per cent).

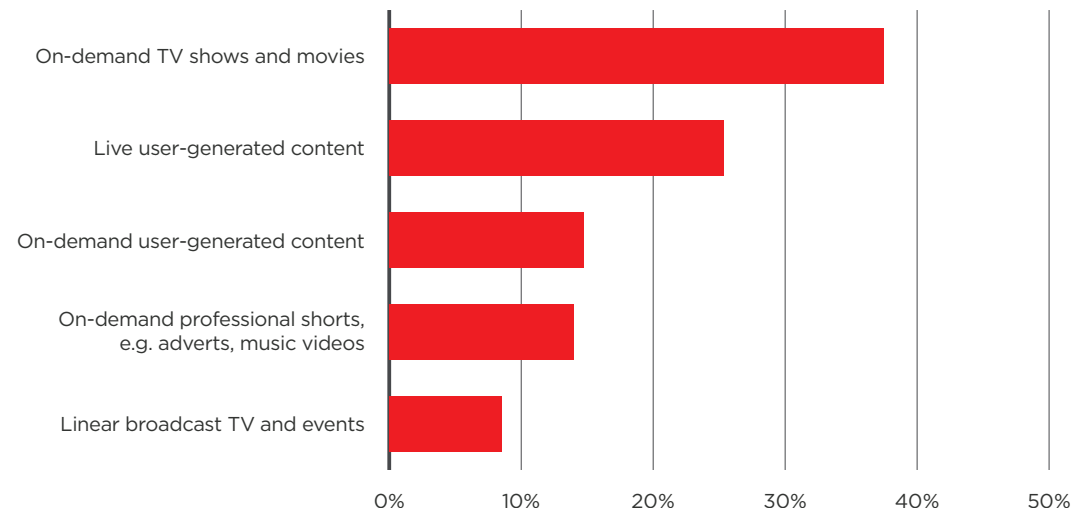
In the next five years, linear broadcast TV is expected to see limited growth. Only 8 per cent of our survey base is tipping this segment to see growth, while a quarter of respondents expect live user-generated content to thrive outside the home.

“29 per cent ranked on-demand as the most popular content to access while out of the house.”

Thinking about smartphone viewing when on the move, what are the most popular content types to view today? (Ranked 1-5)



Still thinking about smartphone viewing when on the move, which of the following content types will see most growth over the next five years?



BARRIERS TO SMARTPHONE USAGE



Form factor matters for video in the home

Research firm Gartner recently projected a particularly tough 2017 for device makers, with worldwide shipments of smartphones expected to remain largely flat, while current average selling prices come under increasing scrutiny.

The expected challenges are in part due to an increasingly maturing market, but there has also been some criticism levelled at major smartphone vendors, including market leaders Samsung and Apple, for a lack of innovation in new devices.

As shown in the previous chapter, respondents believe there will be an increase in video consumption inside the home on a phone, but smartphone makers will need to make some major improvements before that happens.

In the home, it is the video viewing experience that matters.

67 per cent of respondents cited smartphones being “uncomfortable to hold for a long time” as one of the top three reasons why smartphones are not used more frequently for watching video inside the home.

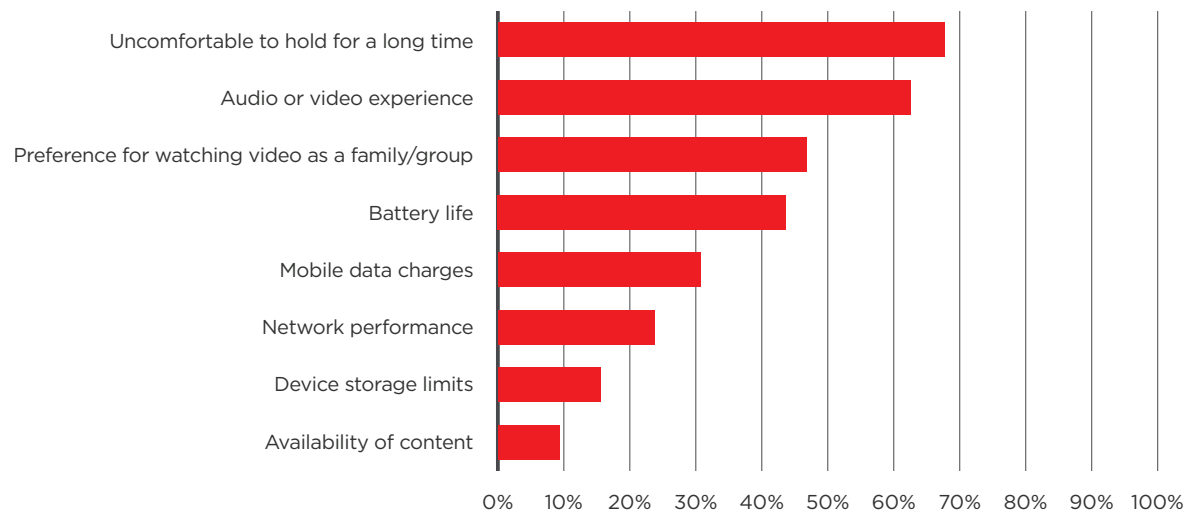
This was followed by 63 per cent citing the “audio and video experience”, while 46 per cent named “watching video as part of a group, or with the family” as the top reason. The latter showing the importance of the social element of this particular activity in the home.

Battery life, meanwhile, was a reason for 44 per cent, followed by “device storage limits” at 15 per cent. This low number for storage would indicate that there is a bigger trend towards streaming content, over downloading.

Mobile data charges, often putting operators under scrutiny for being high, was considered a factor for 31 per cent.

The availability of content, however, proved less of a concern, with only 9 per cent stating this as a potential mobile video barrier, highlighting the number of major television publishers pushing a mobile option to access their content, particularly in developed markets.

What are the top three reasons why smartphones are not used more frequently for watching video inside the home?



“67% cited a smartphone being ‘uncomfortable to hold for a long time’ as one of the top three reasons why smartphones are not used more frequently for watching video inside the home.”

“74% rank BATTERY LIFE as a top three barrier to consuming VOD on the move.”

Batteries, network, and data rates are important for viewing video on the move

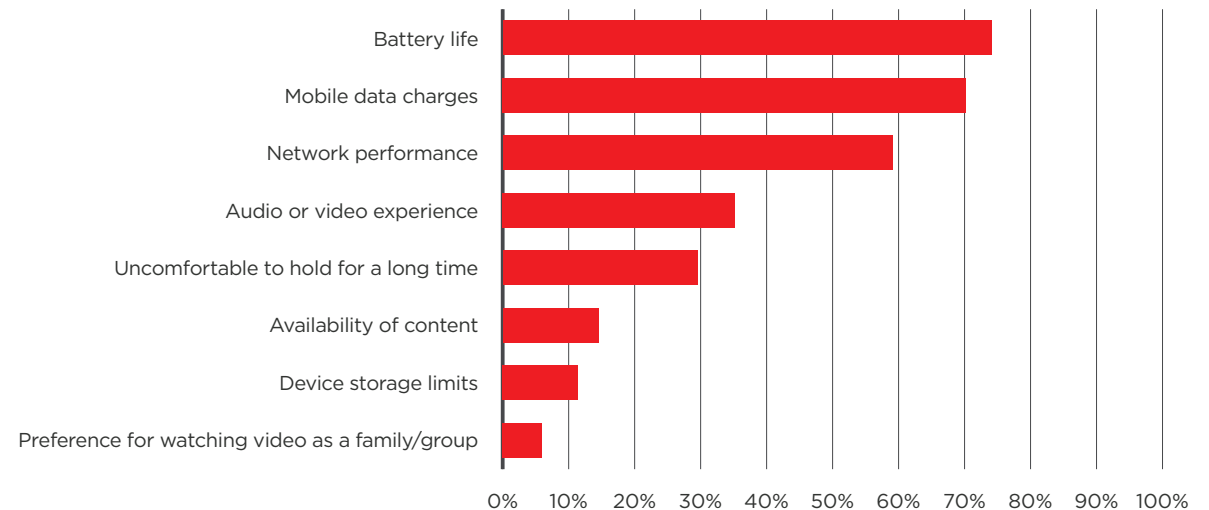
When asked on the barriers of watching video on the move - whether that is on-demand TV shows and movies, or linear TV - there were some common themes in terms of the potential grievances people may experience.

With smartphones used for so many different reasons on the move, battery life was seen as a major barrier with both cases.

74 per cent ranked battery life as one of the top three barriers to consuming on-demand video, as well as mobile data charges (70 per cent) and network performance (59 per cent).

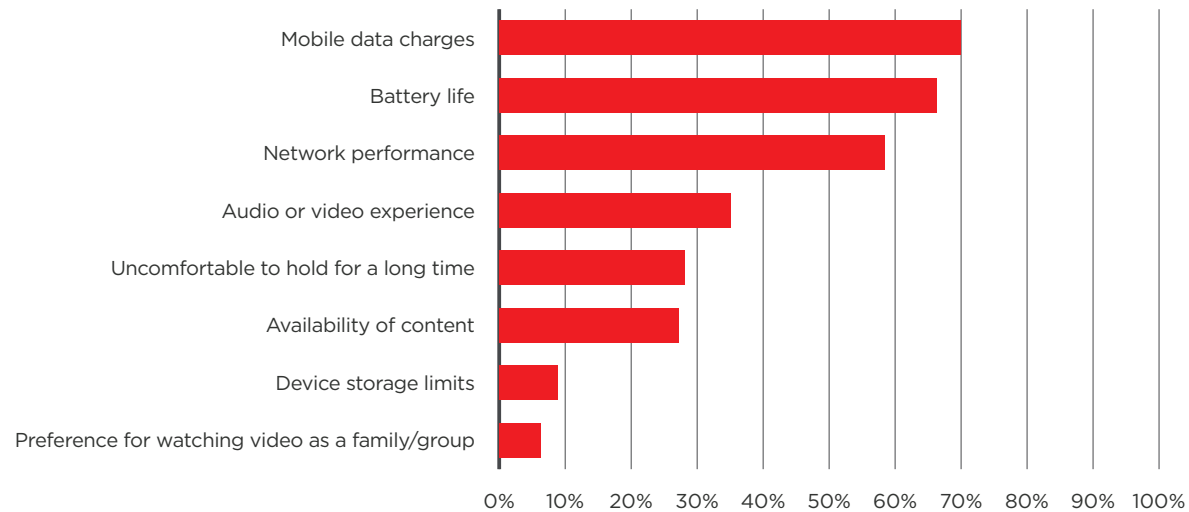
Similarly, data charges are a barrier when watching linear broadcast TV - content which of course cannot be pre-downloaded - with 71 per cent ranking this amongst the top three barriers, along with battery life (67 per cent) and network performance (59 per cent).

What are the top three barriers to watching on-demand TV shows and movies on a smartphone when on the move?



On the other hand, audio and video experience, as well as general comfort, did not rank anywhere nearly as highly as they did when consuming video on a smartphone in the home, suggesting respondents believe users are willing to compromise on quality when watching video on the go.

What are the top three barriers to watching linear broadcast TV channels on a smartphone when on the move?



| ACCESSING MOBILE VIDEO



Wi-Fi is supreme

Before the smartphone became a reality, video content was really only consumed inside the home. Linear broadcast TV made up the vast majority of content, alongside packaged content on DVD or, even before that, VHS tape.

In 2017, the way content can be consumed, and crucially, where it is accessible, has dramatically transformed.

The smartphone gives people the ability to not only watch live video but create it, as well as binge watch shows, movies and download content wherever they are able to get a workable internet connection.

That internet connection, therefore, is crucial.

For 64 per cent of respondents, Wi-Fi is viewed to be the preferred access network for streaming video content, ahead of a mobile network (18 per cent) and watching downloaded video offline (18 per cent).

The popularity of Wi-Fi is not a surprise.

In many parts of the world, Wi-Fi is considered more reliable and faster than mobile, and is also often available free, particularly in major cities of the developed world.

A report from wireless coverage mapping firm OpenSignal last year found that Wi-Fi is the dominant data access technology for mobile users globally. The company further argued that in many places, “Wi-Fi has become a far more important mobile data technology than 3G and 4G”.

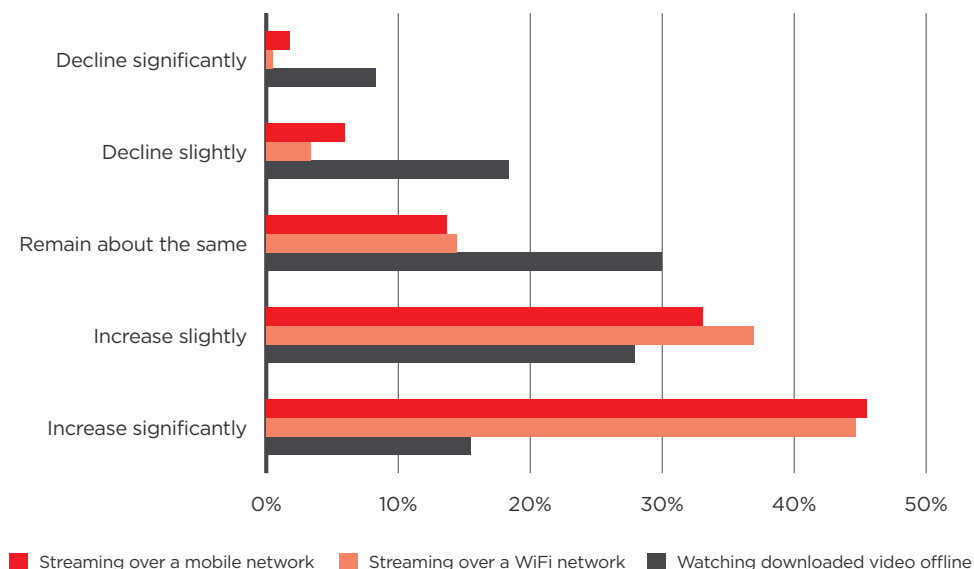
Given the importance of Wi-Fi, mobile operators bundling a seamless Wi-Fi service with their core mobile offerings are likely to have a strong selling point for video hungry consumers.

For mobile networks to become more favoured when accessing video out and about, there is an onus on the operators to not only improve those connections, but to make accessing data more affordable, given the amount that is consumed by streaming video.

And just under half of respondents are confident this can happen. 45 per cent of respondents believe streaming video on a mobile network will “increase significantly” in the next five years, while just under 14 per cent believe the rate will roughly stay the same.

Notably, a 2020 launch of 5G will also dramatically help both the operator and the viewing consumer.

Again thinking about watching video outside the home, how will the following types of usage change over the next five years? (Decline significantly to Increase Significantly)



“64% view Wi-Fi as the preferred access network for consuming mobile video outside the home.”

ROLE OF MOBILE VIDEO STAKEHOLDERS



Mobile operator importance

Mobile operators have long been seeking a way to better monetise their investments in infrastructure, as demands on their networks continue to increase from the consumer.

Given recent projections about the future growth of mobile video demand, a long-term strategy to cash in on this segment is becoming ever more imperative.

Network vendor Ericsson, in its most recent Mobility Report, estimated that mobile video will be the increasingly dominant traffic generator, growing by around 50 per cent annually through to 2022, accounting for nearly 75 per cent of all mobile data traffic.

Over the five-year period, the Swedish company believes this segment will continue to outstrip other types of content-rich applications, including music streaming, gaming and social media.

Indeed, with continued growth of live user-generated video, coming from popular social media applications like Snapchat and Facebook, as well as with growth in subscription video on-demand (SVOD) applications like Netflix, and catch-up TV services from market leading broadcasters, it is no surprise that video traffic, in a range of different formats, is expected to rise even further.

Inevitably, as users continue to use their phones to access content-rich applications, like video, the strain on underlying network infrastructure goes up.

Monetising data effectively has long been an issue, and video can be considered both a burden and an opportunity for the operator.

Across the US for example, we have seen the major operators invest in video convergence through acquisition, with AT&T buying DirecTV and Verizon investing in its media and internet portfolio (with AOL and Yahoo), while pushing its Go90 video platform.

Number three operator T-Mobile US, meanwhile, rolled out Binge On – a zero-rated offer for video streaming – striking partnerships with numerous content providers, and then launched a fixed price unlimited data plan, with mobile video consumption very much in mind.

The US has so far arguably led the way, but other major developed markets are likely to follow suit with their video strategies, indicating the growing importance of operators in this sector.

Tellingly, more than 61 per cent of respondents surveyed believe ***the mobile operator is best placed to drive the use of mobile video on smartphones over the next five years.***

Operators ranked far ahead of mobile device manufacturers (7 per cent) and network equipment vendors (3 per cent).

Video service providers ranked second highest with 24 per cent, while video production studios had just under 4 per cent of the vote.

“Monetising data effectively has long been an issue, and video can be considered both a burden and an opportunity for the operator.”

“61% of those surveyed believe the mobile operator is best placed to drive the growth of mobile video on smartphones.”

LTE-B has a major role to play

In regards to network developments, both faster download speeds and greater network availability are some of the main advancements that respondents believe will fuel the mobile video market when on the go.

However, a technology pioneered heavily by the operator community ranked even higher than both faster speeds and availability, as the major network development to drive mobile video.

LTE-Broadcast, which has been reinvigorated in recent months through an alliance involving Verizon, Telstra, EE and others, is expected by 28 per cent of respondents to be the major network driver in the next five years to push mobile video on the go.

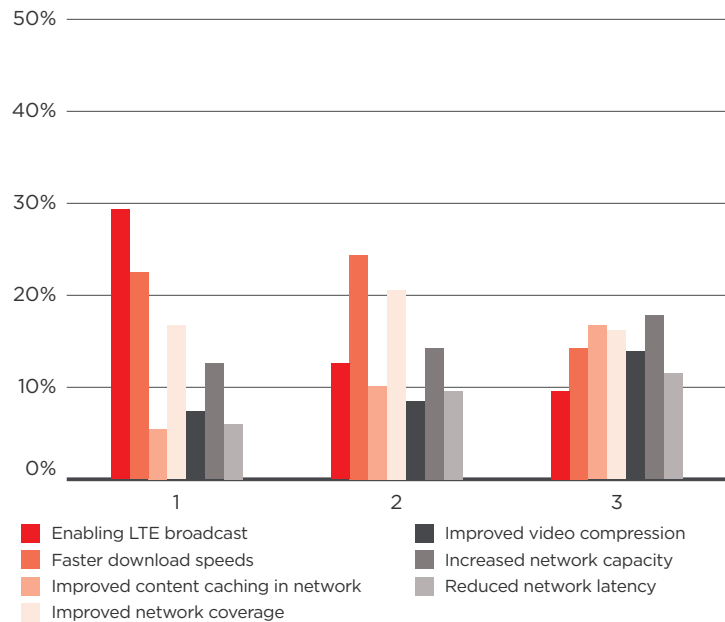
A recent whitepaper from the alliance indicated technical issues surrounding the technology have been overcome, and it is thought to now be ready for further commercial launches.

The lack of consumer appetite to watch broadcast content on their mobile seems to contradict the excitement of operators to promote LTE-B. However, if

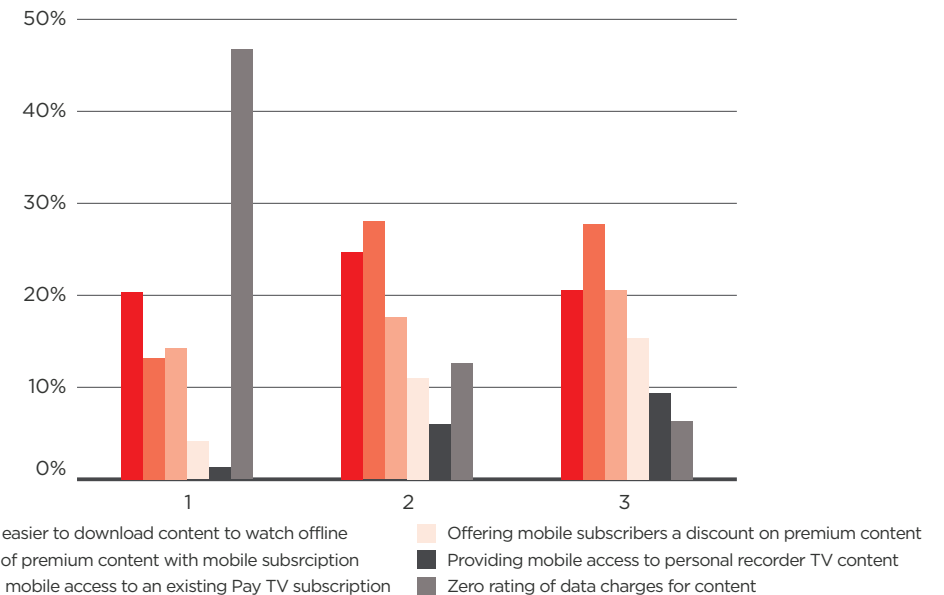
LTE-B is deployed together with a zero-rated offering for broadcast video, it may be a game changer. Indeed, the survey shows that a zero-rated approach is considered most crucial to driving mobile video, winning 47 per cent of the respondent vote.

Zero-rating video has been a popular strategy in the US, where operators don't charge consumers for data if using specified internet applications and services, but the action often comes under some interpretations of net neutrality, so a considered approach will be necessary.

Rank the following network developments in order of their potential to drive the use of video on smartphones when on the move over the next 5 years? (Ranked 1-5)



Rank the following service developments in order of their potential to drive the use of video on smartphones when on the move over the next 5 years? (Ranked 1-5)



Conclusion

The future of mobile video, both inside and outside the home, holds huge potential across the ecosystem, but there is clearly work to be done.

For device manufacturers, it will be important to take note of industry leaders' opinions that while smartphone usage for video is on the up, there are still grievances around sound and video quality as well as general comfort, when using phones specifically for video.

Addressing these issues, and tailoring future smartphone developments around video and entertainment, could be key in persuading people to use their phones more to watch video, even inside the home, in place of TVs.

Meanwhile, outside of the home, a huge barrier is battery life, and as seen by recent smartphone developments, there is a bigger drive on faster charging and a longer usage.

For video, however, incremental handset developments will not be sufficient.

For the operators, as seen with the call for cheaper data rates, and even a call for zero-rated video offers, cheaper mobile plans are a must to encourage people to consume more video while on the go.

Network developments, as expected with the future launch of 5G and LTE-B technologies, and the wider availability of 4G and Wi-Fi, will also be crucial in ensuring that operators are able to cater to this huge demand for video.

Building on these reasons, the survey shows why operators are best placed to drive mobile video growth over the next five years.

What is abundantly clear is the fact that demand for mobile video content will keep growing strongly, and there is clear merit in believing that the resulting traffic will be a major driver of network capacity a long way into the future.



Cartesian, Inc. (NASDAQ: CRTN) is a specialist provider of consulting services and managed solutions to leaders in the telecoms, digital media and technology industries. The firm offers a unique combination of sophisticated analysis, real-world experience and in-depth industry knowledge.

In 2015, Cartesian further strengthened its capability to serve the converged communications sector through the acquisition of Farncombe, a leading consultancy in TV and video.

Cartesian's clients include mobile network operators, MVNOs, equipment vendors, TV broadcasters and content distributors. The company has offices in Boston, Kansas City, London, New York, Paris, Philadelphia and Washington.

Find out more: www.cartesian.com



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