JUNIPER RESEARCH'S TOP 10 TECH TRENDS FOR 2020

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Over the past year, tech industries have continued to evolve at pace, with a host of emergent technologies such as RCS, MaaS and most of all 5G deployments reshaping the technological landscape.

In this Trends document, we provide our assessment of what we believe will be the critical developments in the tech space for the coming year, developments that will impact on, and be driven by, both players across the value chain and the consumers themselves.

1.1 Last-Mile Fibre Rollouts to be replaced by 5G Connectivity

Fibre rollouts continue to be costly for operators; however this issue becomes prevalent once FTTP (Fibre to the Premises) are considered. Indeed, to offer the ultrafast connectivity provided by FTTP these costs extend to installing fibre to every single property in the area.

Current last mile solutions, including LTE and copper to the premises, are not able to deliver the same level of bandwidth and latency as FTTP connections. Therefore, to offer ultrafast broadband services, Internet services providers must offer FTTP connections.

Juniper Research believes that FTTP connections will be financially unviable as the expenditure of a rollout does not offer a clear path to a return on investment.

Figure 1: Different High Bandwidth Last Mile Solutions
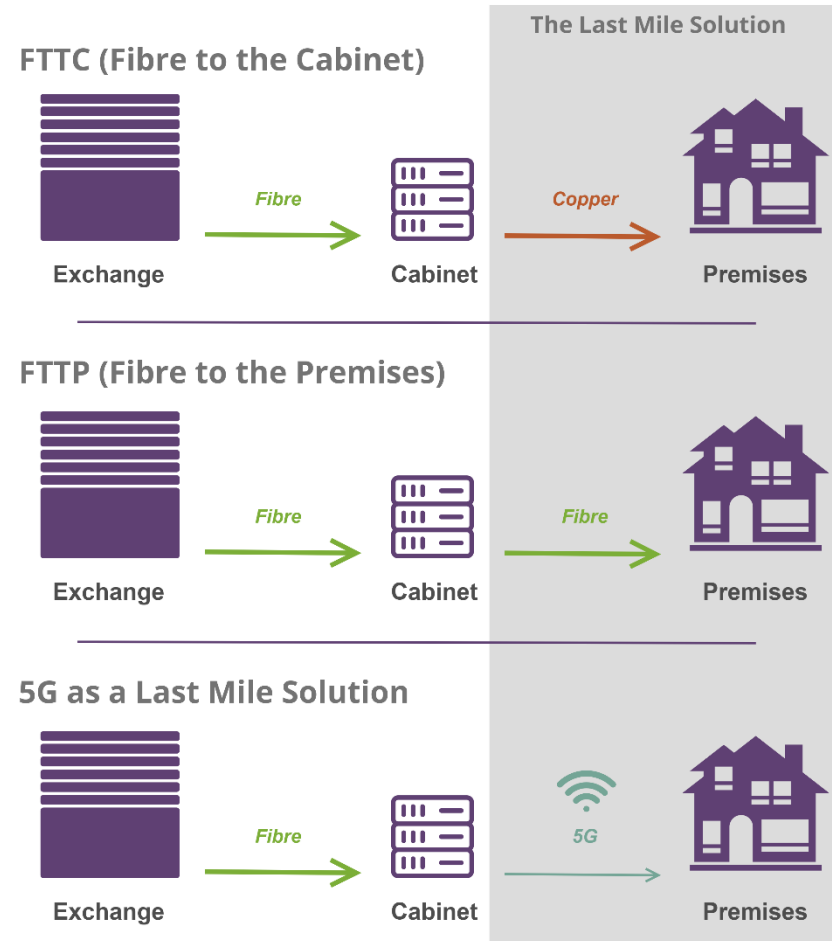
Source: Juniper Research

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However, Juniper Research believes that the advent of commercial 5G networks in 2019 will provide a more cost effective last mile solution for the ultrafast broadband services.

In 2020, Juniper Research anticipates that the mobile network operators will focus on rolling out 5G as a last mile solutions for FWA (Fixed Wireless Access) services. Launches will occur in areas previously underserved by fibre connectivity or in areas where fibre rollouts were considered unviable. In turn, this will also free up funding from telecommunications bodies, such as the FCC in the US and Ofcom in the UK.

This market shift would have a significant impact on the provision of a consumer Internet service:

- Mobile network operators would play a more prominent role in the provision of Internet services. However, to remain competitive, operators must ensure that FWA services are able to offer a similar level of service to solutions underpinned by FTTP connections. A failure to do so will lead to end users abandoning the prospect of FWA services leveraging 5G for the last mile solutions before the technology experiences any significant adoption.

- Mobile network operators will essentially generate a new revenue stream from FWA services. Early mover advantage is key here; operators can capitalise on the development of 5G and the heavy investment in network rollout to generate an entirely new revenue stream.

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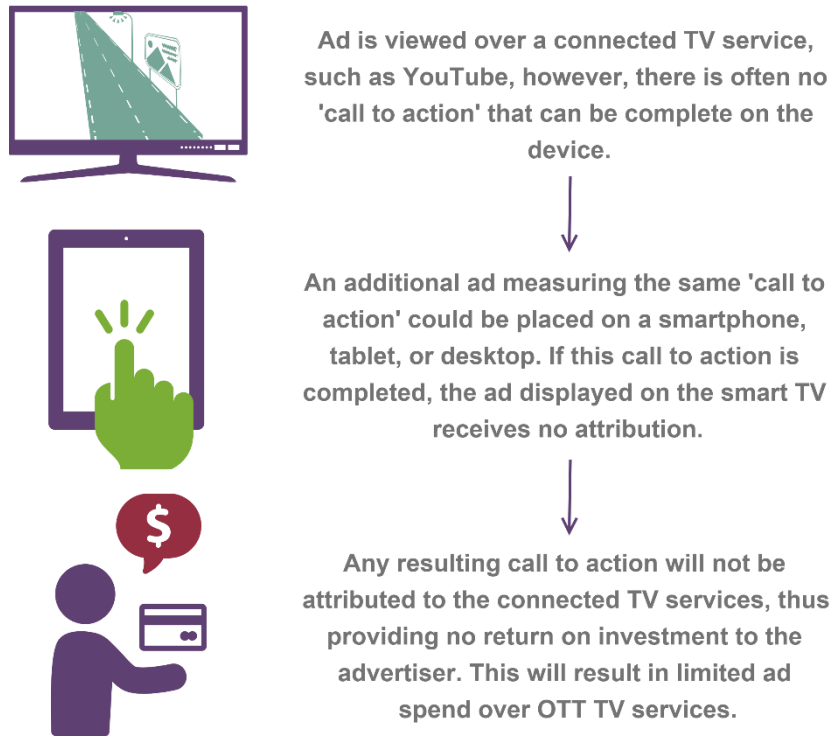## 1.2 OTT TV Advertising Stakeholders to Develop Functional Attribution Ecosystem

Given the large sums involved in the digital advertising industry, advertisers are constantly seeking out new channels through which they can engage with digital users.

Ad attribution continues to evolve, with attribution platforms becoming an integral part of the digital advertising ecosystem. These players have grown to offer multi-touch attribution and fraud detection. This evolution has been enabled through increasing the transparency between all the different stakeholders (advertisers, publishers, attribution platforms, anti-fraud solutions) and the standardisation of identifiers including the delivered ad, the user and the device.

At present OTT (Over-The-Top) TV services do not integrate well with the wider digital advertising ecosystem; however, in 2020, Juniper Research anticipates this will change as incumbent ad attribution service providers

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expand their services to include OTT TV devices and connected TV services.

Figure 2: Current Failures in OTT TV Advertising Attribution

Ad is viewed over a connected TV service, such as YouTube, however, there is often no 'call to action' that can be complete on the device.

An additional ad measuring the same 'call to action' could be placed on a smartphone, tablet, or desktop. If this call to action is completed, the ad displayed on the smart TV receives no attribution.

Any resulting call to action will not be attributed to the connected TV services, thus providing no return on investment to the advertiser. This will result in limited ad spend over OTT TV services.

Source: Juniper Research

At present, this ecosystem is unable to offer the same services in terms of attribution. As a result, advertisers are unable to measure a return on

their advertising spend for these devices which results in high-spending advertisers overlooking the OTT TV ecosystem entirely.

However, a functional attribution process in the space would allow advertisers to benefit from increased reach to digital users if OTT TV devices can be fully integrated into the attribution platforms that support cross-device attribution.

In addition, OTT TV content providers will be able to explore additional revenue models, such as the freemium model, in which they can offer services for free and generate income through advertising.

However, to foster an effective ecosystem, standardisation has to occur. This standardisation needs to focus on three key areas:

- **Devices**: This would enable advertising attribution platforms to monitor where ads were delivered and link the attribution to a single user regardless of device.

- **Ad Impressions**: This would allow the advertising journey of each ad impression to be followed closely. Therefore, any call to action can be traced to relevant ads.

- **Users**: This is where the value of the attribution platforms lies for the market. This allows advertisers to identify ads placed on multiple devices, thus ensuring that an ad being displayed on one device can be linked to a call to action from the same user on a different device. This

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is essential for advertising on smart and connected TVs as the device's functionality essentially lacks the 'call to action'.

## 1.3 Open Data in Transportation to Drive MaaS Beyond Europe

To date, MaaS (Mobility-as-a-Service) has been in a pilot phase in Europe, with deployments in Helsinki and Stockholm. By 2023, Juniper Research forecasts that over 80% of global MaaS users will be located in Western Europe. However, we believe that rollouts of MaaS services will be outside Europe over the next few years, notably in North America and Asia Pacific.

Partnerships amongst MaaS stakeholders are critical to the development of a functional service. Indeed, given the many different players needed to provide a comprehensive services, Juniper Research feels that open data initiatives are essential to creating such services. These initiatives must involve real-time data on services, for shared mobility options:

bikes, eKick scooters, eScooters, shuttles, car-sharing and taxis, in addition to public transport options.

The inhabitants of cities will, of course, be the biggest beneficiaries of the rollout of MaaS services. As MaaS emerges outside Europe, many advantages will drive its adoption such as utilising integrated siloed data sets from different stakeholders in transport. In turn, this will benefit travellers and ensure that they receive the best travel route pricing, the best travel route options and the least amount of time spent traveling.

Figure 3: Global Number of MaaS Users (m) Split by 4 Key Regions 2018-2020
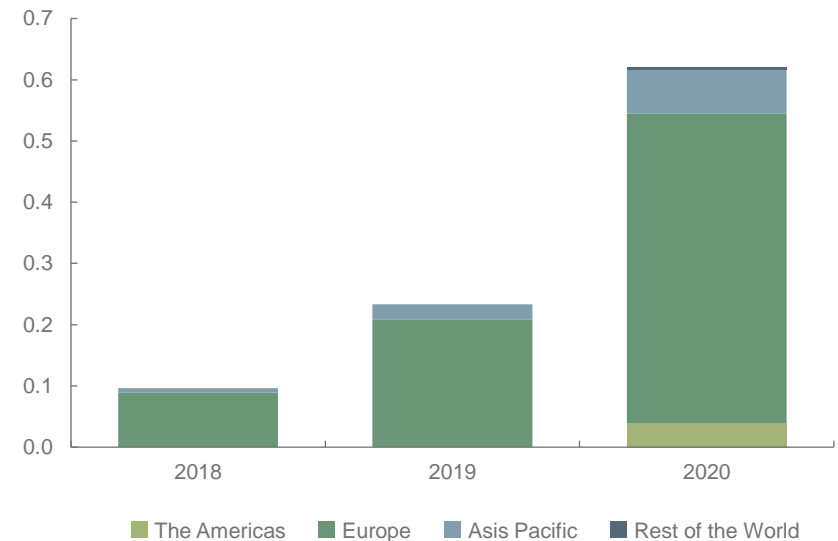
Source: Juniper Research

Using open data initiatives in MaaS services will crucially enable city planners to address environmental concerns such as carbon emissions. During 2020, we expect MaaS services, underpinned by open data initiatives, to be explored in cities such as Tokyo, Japan; Seoul and cities in the US.

In order to be responsive to changing conditions, open data initiatives must be established to offer real-time data exchanges between the varying stakeholders from the start. Given the anticipated multi-modal nature of a future successful MaaS ecosystem, partnerships must be formed by stakeholders as a priority.

Juniper Research anticipates that the sharing of open, real-time data collated on transport conditions will heavily benefit small cities that often lack a digital transport, or MaaS, plan and an ability to aggregate data. Governments and transport organisations must assess the risk of sharing data with the public openly.

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1.4 Subscription Models to Flourish in Games Market, but 'Live' Elements of Games will Diminish

The games market has evolved significantly over the past few years in terms of available content and distribution ecosystems, such as the development of digital downloads for AAA-rated console games.

The nature of games has changed and become centred on the concept of monetisation and how to maximise the return on investment of games content. These developments have led to the development of games-as-a-service. **Games-as-a-service has numerous definitions, but primarily means adding live elements to games which can be monetised, including in app purchases, DLC (Downloadable Content), loot boxes and subscription to individual game elements.**

The growing prevalence of the games-as-a-service model has not been broadly welcomed by of games service users and has had particular criticism for the extent to which microtransactions can affect the game's mechanics. Vocal critics have compared this monetisation model as 'pay-to-win', limiting in-game progress to affluent users willing to spend disposable income on in-game elements.

In addition to this negativity, there has been a recent poor reception of 'live' games. *Ghost Recon: Breakpoint* from Ubisoft has in particular struggled with poor consumer reviews and the over-implementation of live elements, along with criticism of other franchises.

Additional concerns about loot boxes and gambling have also resurfaced, with regulatory bodies in Europe intervening over the past 18 months.

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These concerns will persist as children become susceptible to overspending.

Figure 4: Examples of Games-as-a-Service Platforms

Source: Juniper Research

However, at the same time, the implementation of subscription passes for games has flourished, gaining popularity rapidly. Xbox Game Pass has become a highly popular among users, based on its strong value proposition. As several games are added to the service monthly, with a relatively low monthly fee, the value is clear. This same model is

replicated in other services, including EA Access, Origin Access, PlayStation Now and others.

In recent times, there has been a significant renaissance in single player games, despite many predictions of their demise. Games such *as Star Wars Jedi: Fallen Order* have launched to widespread critical acclaim, with other games such as *The Last of Us: Part II* and *Cyberpunk 2077* promising to show the appeal of single player content as we progress to 2020.

Juniper Research predicts that subscription video gaming models will continue to gain traction owing to their strong value proposition for users; however we anticipated that 'live' elements, including microtransactions will reduce in prevalence.

We expect that these changes, while positive for the market, will result in some consolidation of smaller and mid-level developers and publishers, which will go further to ensure the continued domination of the larger publishers and console manufacturers.

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1.5 Netflix to Seek out New Sources of Revenue Growth as Competition Rises

Netflix, while a clear leader in the video streaming market, has repeatedly had its competition in the video streaming market intensify. There are now numerous parties vying for user adoption, competing on both price and content offerings. Netflix has traditionally faced competition from established players such as Amazon Prime Video or Hulu, but it is now being challenged by an ever-growing list of service providers, including Apple TV Plus, Disney Plus, CBS All Access, Britbox and HBO Max, to name but a few.

These new challengers provide intense competition due to their different strategies in terms of content and monetisation. For example, Apple TV Plus is attempting to create high quality content, using recognised household names. Disney Plus is leveraging its unique back catalogue and the strong brands it holds, including many Disney films, Star Wars and Marvel. CBS All Access leverages key franchises, including *Star Trek*, to drive consumer adoption.

In this context, Netflix's own differentiation strategy has become rather muddied of late. Traditionally, it relied upon licensing a large amount of premium third-party content, but much of this has been restricted to use in separate streaming services. Netflix has pivoted to creating its own content, spending just over $12 billion on developing content in 2018, but has struggled to gain critical acclaim for its productions.

As a result of these pressures, Netflix will seek new, more sustainable sources of revenue growth in 2020, by producing more localised content and investing in sports content.

In order to revive its growth, Netflix will have to seek areas of the market that are currently underserved by its competitors. Accordingly, Juniper Research expects Netflix to focus on enhancing the quality of its TV content offerings in 2020, particularly in emerging markets, and in some cases by region within those markets, via local languages.

Furthermore, Amazon has succeeded in showing sports content on Prime Video, demonstrating that there is potential for other streaming providers in this area. Despite stating in 2018 that it would not broadcast news or sports content, Juniper Research believes Netflix will change this strategy to enable further growth.

Figure 5: Total Revenue from SVOD Content ($m), Global, 2018-2020
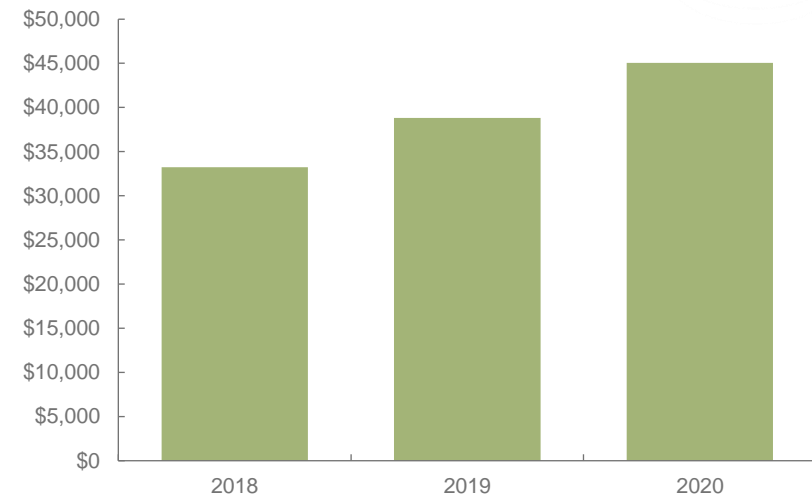
Source: Juniper Research

The primary beneficiary from this change will be Netflix itself, as it will revitalise its own subscriber growth, by leveraging growth sources outside its traditional strategy.

By purchasing sports content rights, it will stimulate its growth in established markets, significantly increasing its value proposition for end users. As a result, users will have more engaging content on the service.

By increasing their engagement with users internationally and investing in local content, Netflix will gain an early mover advantage. This is particularly important, given the saturation in developed markets, with users already shelling out large monthly amounts on services.

However, this saturation is nowhere near as pronounced in developing markets, meaning there is a strong opportunity to capitalise on underserved markets.

This user growth will likely be to the detriment of other streaming services. Indeed, given the intense competition in the market, consolidation in the longer term in the streaming area is inevitable. Netflix will be well positioned to acquire any streaming services from players exiting the market, which would shore up its market share even further. However, there are likely to be regulatory interventions on competition concerns if Netflix were to acquire rivals, which will require careful management.

Juniper Research predicts that these anticipated changes by Netflix in its core strategy will enable it to return to buoyant user number growth, both inside and outside the US. This user growth, plus the strong competition

in the market, will drive the overall revenues the chart above, showing how valuable the market is. These themes are explored further in our Digital TV & Video research suite.

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1.6 Google to Expand RCS Services in Europe

RCS messaging will provide enhanced features, such as rich media and interactive consumer elements, through established SMS and OTT messaging services like WhatsApp and Viber. However, as a messaging technology, RCS has repeatedly failed to meet expectations in terms of handset and operator support, despite Google entering the market as a RCS profile provider.

We anticipate that these benefits will become particularly popular with brands and enterprises as they seek to develop new mobile channels to communicate with their customers. Capabilities for brand authentication and AI-based chatbot functionality are examples of the services that will be of particular benefit to business messaging users as the service becomes established.

Eventually, Juniper Research believes that the RCS-enabled messaging client on smartphones will become the *de facto* mode of communication,

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with mobile apps becoming secondary channels. Additionally, RCS will create a new revenue streams for operators; we believe that RCS Business Messaging will create new traffic and will not take content away from the established SMS ecosystem.

Google announced in July 2019 that it would begin to support RCS on its proprietary messaging app, Android Messages, in France and the UK. This bypasses the need for operator support of the messaging technology which has had significant ramifications on the market structure:
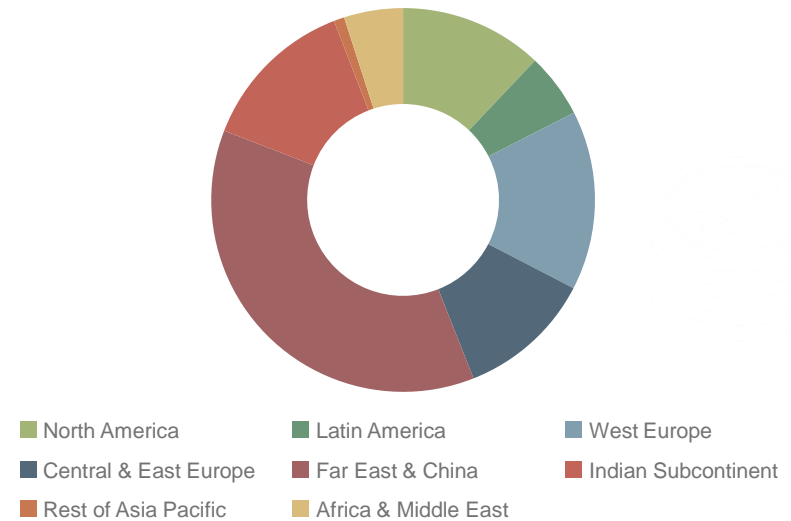
- Firstly, operators are losing out on potential revenues from RCS business messaging services. In a similar fashion to SMS business messaging, operators will be able to charge a premium fee over P2P traffic.

- Secondly, Google would drastically increase its position in the messaging market, as it would be central to processing the message content. This poses problems for the security of messages given that RCS is not secured by end-to-end encryption, thus would allow Google to view the content of RCS messages it handles.

We expect that Google will continue to expand RCS support for its messaging support in Europe during 2020; however, the goal of Google's launches is to motivate operators to support RCS services in the future.

Google will continue to capitalise on the growth of its own RCS services, regardless of whether the service is led by operators or Google itself. However, Juniper Research believes that Google will view this as a strategy to increase RCS presence in the long term, regardless of whether the service is underpinned by Google or mobile operators. This

will be done by highlighting the benefits of the technology through its own app.

Figure 6: Global Number of RCS-capable Subscribers in 2020: 270 million

Legend:
- North America
- Latin America
- West Europe
- Central & East Europe
- Far East & China
- Indian Subcontinent
- Rest of Asia Pacific
- Africa & Middle East

Source: Juniper Research

However, this strategy has drawbacks; the app is not the default on a number of smartphone models and will have to be downloaded by the smartphone user manually. Given the lack of consumer awareness about RCS, this is likely to severely limit the actual usage of the service.

Enterprise usage of RCS is also likely to be limited as the largest brands and advertisers wait for operator led-support. As a result, users may not see the full benefits of the technology in Google's RCS service.

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1.7 Google to Leverage Fitbit Health Credentials to Mount Challenge to Apple Watch

Alphabet's Google announced the acquisition of fitness leader Fitbit in early November; the $2.1 billion deal is expected to close in 2020. While the details of the acquisition have not yet been released, Juniper Research anticipates that Google will release a new smartwatch in 2020, which will mark Google's entrance to the smartwatch market with its own-brand hardware.
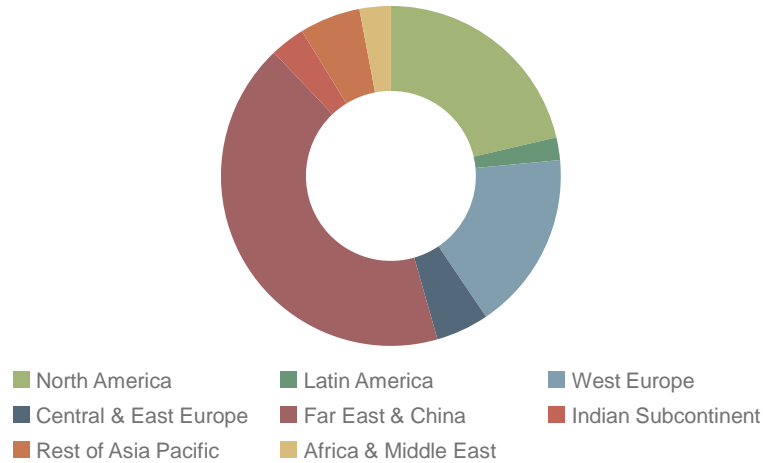
While Google's impact on the smartwatch market has been lower than that of Xiaomi, Samsung, Apple or Fossil, we believe the company has the resources to quickly capitalise on this acquisition, as it has been working on its healthcare solutions already. Combined with Fitbit's large presence in the fitness space, Google is already looking for ways to connect its Google Fit app to Fitbit's Plus app.

We believe that Google is now ideally placed to build on the pool of talent it has acquired over the years. This includes Pebble, itself acquired by Fitbit in 2016, along with technology from Vector, Coin, Fitstar and Twine Health. Furthermore, Google confirmed its strong interest in smartwatches in early 2019 by acquiring $40 million worth of intellectual property relating to smartwatch technology previously owned by Fossil Group. We believe that Google will now leverage its talent pool, development capacity, established brand name and considerable financial resources to provide users with an improved ecosystem composed of better hardware, software and features.

The release of a new smartwatch will most benefit Google, which will seek to dent Apple's market share and gain a stronghold in the smartwatch market. Indeed, the company will want to capitalise on the market, with shipments expected to reach 166 million by 2023. A good quality smartwatch would enable Google to attract customers frustrated by Apple's closed ecosystem and eager to connect all their Android devices. In addition to market share, Google is mostly looking to gain a considerable amount of data through the deal. Indeed, Fitbit currently has 28 million active users syncing their steps, sleep patterns or meals through Fitbit smartphone app.

Smartwatch users will benefit from a new device with a better OS. WearOS has recently had setbacks, such as Huawei's decision to use its own OS in its latest smartwatch, the Watch GT. While WearOS now offers more intuitive navigation with a smarter voice assistant and overall more user-friendly design than previous iterations, improvements are still needed when it comes to battery life, bug fix and the capability of fitness tracking offered by competing OSs.

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Figure 7: Smartwatches Shipments: 166 million by 2023

- North America
- Latin America
- West Europe
- Central & East Europe
- Far East & China
- Indian Subcontinent
- Rest of Asia Pacific
- Africa & Middle East

Source: Juniper Research

However, the tech giant will have to address rising security and privacy concerns amongst the Fitbit community with many users already warning that they will use a different smartwatch provider after the deal closes. Thus, we anticipate that Fitbit's installed base will fall slightly in 2020 when the deal closes. However, we believe that the installed base of the Google-branded Fitbit device will increase again in 2021.

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1.8 Huawei Ban will Result in More Uneven 5G Network Growth

Following the lead of the US, a variety of countries have decided to ban Huawei and ZTE from being part of the emerging 5G network infrastructure. This has been either through outright company-level bans, as we have seen in the US, Australia and Poland, or through the prohibitions on specific parts of the network, such as the UK has announced.

Several companies, most notably Deutsche Telekom, have declared that these bans and strategies to restrict Huawei and ZTE's involvement in the 5G equipment market will severely limit the ability of many countries to deploy 5G infrastructure.

Also, with less competition, prices for 5G network infrastructure will be higher in countries where the Chinese vendors are banned or restricted in their operations. With the initial proof-of-concept 5G networks deployed, 2020 will be the year that truly nationwide deployment efforts emerge, and questions of value will come to into play in a way they have not to date. As a result, the biggest impacts of the bans will land next year.

The ban will have its biggest impact on those operators that are more concerned about securing value from their deployments, than being the first to deploy. For example, Germany's spectrum auction was priced at over €6.5 billion, meaning budgets for deployment will be lower than expected there already, and thus more sensitive to any price changes. With EU security restrictions stoked by the ban, Germany's 5G rollouts will be much slower, with the effects felt through 2020 and beyond.

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Even once the initial networks are in place, the effects of any ban are likely to linger. If other equipment vendors can put in a good performance for their initial contract, then operators will be more inclined to remain with their initial suppliers.
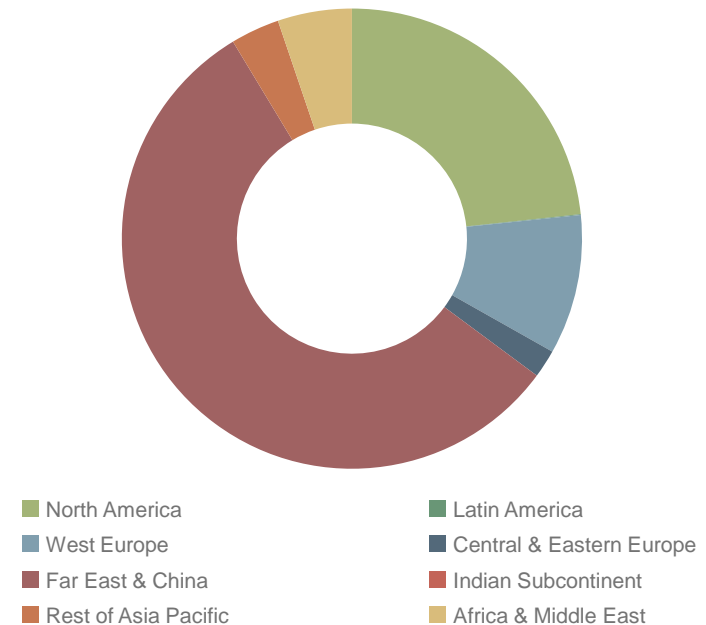
While the presence of Chinese firms at a later date will accelerate the drop in prices, if they are excluded from initial deployments then it will be relatively simple for other providers to aim to match them on price, and lock them out of the market. Other network vendors, most notably Nokia and Ericsson, stand to benefit the most here, as they will not have to match Chinese vendors on price out of the gate. This will result in a slower overall rollout, but it will mean higher margins for the vendors that are still in play.

It will however delay deployment to a degree; as a result 5G revenue growth will accelerate more in 2021 and we will see the highest growth in revenue from 5G services, reaching over $20 billion worldwide, compared to the $5 billion we expect in 2020.

For the areas where Huawei can be a full player in the 5G ecosystem, lower prices will accelerate the growth of the technology overall. Juniper Research believes that this will result in a two-speed market; those countries which accept the Chinese vendors will have markedly higher levels of deployment than those that do not, thanks to increased competition in the market.

Partial bans, such as the one that the UK has proposed, will lead to a situation where the technology will have a similar effect on the overall market to a total ban. Being permitted to use chips on antennas will give Huawei access to a relatively commoditised section of the market, meaning the effects of increased competition will be relatively small.

Figure 8: 5G Service Revenues in 2020, Split by 8 Key Regions

- North America
- Latin America
- West Europe
- Central & Eastern Europe
- Far East & China
- Indian Subcontinent
- Rest of Asia Pacific
- Africa & Middle East

Source: Juniper Research

We also expect the bans will have a long-term impact. With Chinese companies excluded from these early deployments, they will have had no opportunity to build up a reputation for reliability in these markets. Given the general lifespan of base stations and telecoms equipment, we expect these differences in the market to persist throughout the 2020s.

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1.9 Consumer Robots to Launch using Subscription Models

The past 18 months have been highly challenging for the consumer robotics market. There have been several high-profile manufacturer failures, with three cases proving particularly noteworthy:

- Anki, which manufactured Cosmo, Vector and Overdrive, had built a significant presence in the market. It had raised $182 million in venture capital funding since it was founded in 2010. Anki reported that it was approaching $100 million in revenue in 2017. However, it closed in April 2019, citing insufficient funds to do deliver its long-term roadmap.

- Jibo, which created the Jibo social companion robot, had also made progress in the market, delivering a device which many users made a part of their homes. This was propelled by over $70 million in funding, over its seven year lifespan. However, earlier this year the company shut down, leaving the devices unsupported.

- Mayfield Robotics, maker of the Kuri home robot, shut down late in 2018. This was due to Bosch, its parent company, deciding that the product was 'not a business fit'.

Figure 9: Robotics Offerings from Anki, Jibo & Mayfield Robotics

Source: Anki, Jibo, Mayfield Robotics

In addition, Sphero, the manufacturer of the highly successful BB8 robot, which tied in with *Star Wars: The Force Awakens* recently pulled out of entertainment robotics, choosing to focus on educational robotics instead.

The key reason for failure in each case is that there were no recurring revenues generated by any of these vendors. The purchasing model was highly transactional, with customers purchasing one model then not making any other purchases. This is highly challenging for vendors, as these devices require an app for an interface, which has upkeep and ongoing development costs, as well as research and development costs for future models. With no recurring revenues to offset this cost, robotics manufacturers have struggled.

However, subscription models have proved their worth in other markets, and have gained broad consumer acceptance. Therefore, robotics

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manufacturers should bundle devices, ongoing cloud-enabled capabilities and content to generate a more reliable revenue stream.

Subscription models started in content (primarily audio and video) but now touch many different industries and markets, including everything for eCommerce, rewards schemes, leisure and transport. Indeed, the smart home market has already shown that subscription models can work for devices. Many smart home vendors offer subscription packages that enable app control and cloud-powered capabilities, such as security camera recording. This can be applied to the robotics market, likely with great impact.

The primary beneficiary from this change will be the manufacturers themselves, with additional benefits for end users:

- Manufacturers will benefit from an ongoing stable source of revenues, which can be leveraged to support the development of content and further R&D for new devices. This reduces the pressure on new robotics devices to individually perform in terms of sales numbers, somewhat obviating the cyclical nature of the market to date. Also, by introducing a more sustainable stream, vendors will not have to rely on commercial licensing partnerships, such as film tie ins. While these have led to temporary success for some vendors, when they fail to repeat this success this causes major problems.

- End users will benefit from enhanced features that manufacturers can build, as well as better app experiences which will improve over time. Ultimately, end users will benefit most significantly from a more stable industry, which reduces the likelihood of the user being burdened with a device that is no longer supported.

This will mean business models in this market change fundamentally, with a completely new approach taken by major manufacturers. This will enable greater sustainability for manufacturers, will mean that consumer robots are supported by frequent updates to content and will generate opportunities for partnerships in the smart home ecosystem.

There have also been signs that major consumer electronics manufacturers, including Sony, LG and Samsung are becoming increasingly interested in this market. These trends are examined further in our recent Consumer Robotics research suite, which contains insights on this market.

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1.10 Voice Assistant Security Concerns Come to a Head, Causing Trouble for Smart Homes

Voice assistants are becoming highly important in the smart home ecosystem, fuelled by a battle by the main voice assistant vendors (Amazon and Google primarily) to sign as many smart home partnerships as possible. Crucially, voice assistants, usually in the form of smart speakers, provide an important interface mechanism for the smart home, circumventing complex app experiences.

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However, voice assistants have come under much criticism of late, in particular for the potential for employees to access user recordings and queries, causing significant privacy concerns. In April 2019, Amazon admitted that staff listen to samples of voice assistant conversations with users to improve speech recognition. In July 2019, Google admitted that it operated the same policy with its Assistant, with many conversations accidentally recorded.

This means that the role these assistants play in the smart home is under threat. While many devices offer the ability to disable microphones, user trust is in serious jeopardy. This is a critical issue for both voice assistant vendors and smart home manufacturers, as well as the role such assistants play in other areas including in cars and in consumer robotics devices.

We believe 2020 will be the year this comes to a head for a range of reasons:

- The regulatory landscape in several jurisdictions has become much more privacy centric, particularly with the advent of the GDPR in the EU. California has also passed its Consumer Privacy Act, which contains provisions that include the need to obtain parental consent for collection of data of minors under 13, the ability to opt out of the sale of data and mechanisms to submit data access requests. The chances of further regulatory provisions for multiple jurisdictions is high, given the prevailing environment.

- Specific concerns about voice assistants and how the data is accessed, stored and used have been raised throughout 2019, with much concern in the media and by politicians around the level of access these vendors have, and how they control this access.

- The overall atmosphere, particularly for regulators, is to challenge the growing influence of technology companies through regulatory means at their disposal. The Cambridge Analytica scandal was the first of many events which attracted regulatory scrutiny. Google has had significant regulatory problems in Europe in terms of anti-trust, as has Apple with state aid in the Republic of Ireland. Recently, Facebook has been in the limelight with many concerns about its backing of the Libra cryptocurrency project.

These factors together mean that there is a serious challenge to voice assistant vendors, with their role in the smart home particularly vulnerable. Voice assistant vendors will therefore need to take serious steps to address these concerns to sustain overall growth. Primarily two measures need to be taken:

- We expect these vendors will be made to set clear and transparent rules about data sharing, who can access what data and for what reason, which will be highlighted to users. This will reduce the overall concern and highlight issues for users who may not be aware of the challenges.

- Smart speaker and smartphone manufacturers will design more processing power in their devices, enabling much more data processing to happen on the devices. This will remove the need for data to shared on such a scale, reducing the issues significantly.

There are two main groups that will benefit from the changes, consumers and vendors:

- Consumers will benefit from a much clear relationship with vendors, with clear and transparent understanding of what their data is being

used for. They will also benefit from reduced latency in devices, with more queries handled at a local level.

- Vendors will benefit from reduced regulatory and media concern about their operating practices, enabling them to pursue smart home and automotive partnerships at scale.

Juniper Research predicts that this rebalancing in the voice assistant market will enable smart speakers to become central to the smart home, significantly enhancing the ecosystems which vendors have sought to build. Indeed, we believe that this will drive the use of around 180 million voice assistants for smart home control in 2020.

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