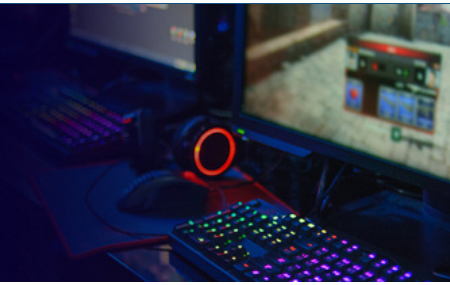


**eSports**

# From Wild West to Mainstream



eSports are moving into the mainstream. The immense popularity of survival-based games like Fortnite, growing prize pools for eSports tournaments, the rise of live-streaming, and improving infrastructure for pro leagues have all paved the way for eSports to reach nearly 300mn viewers by 2022, on par with NFL viewership today. For game publishers, we believe eSports will not only help to increase audience reach and engagement, but also drive direct revenue through established leagues. We see further tailwinds to the broader eSports ecosystem—including online video platforms, hardware manufacturers (core and peripheral), and chip makers—opportunities we outline in this report.

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## Executive Summary

As defined by the Oxford English Dictionary, a sport is “an activity involving physical exertion and skill in which an individual or team competes against another or others for entertainment.” Under this definition, we believe eSports are as much of a sport as any other, and one that at the highest levels requires intense training and focus. Professional eSports teams train for up to 8 hours a day, have coaches, trainers, and nutritionists on staff, and players receive base salaries, just like any pro sports league. In the U.S., there are roughly 50 colleges that have varsity eSports teams, and eSports are under discussion for inclusion in the 2024 Paris Olympics, according to the BBC.

To play a traditional sport, one typically needs access to an appropriate venue (field, court, etc.), and to be successful, it almost always helps to be big, fast, strong, or coordinated - or better yet some combination of all four. To play multiplayer video games, all that is necessary is the requisite hardware and an internet connection — and there is a community of millions of players online that are ready to play at any hour of the day. Also, to become successful at eSports, physical stature is not as important, in our view, as reaction time, focus, and strategic thinking. Therefore, we believe professional video game play can be appealing to a massive global audience of people who can watch and learn from pros and try to improve their own gameplay — something that we believe isn't as possible for most traditional sports fans. And because the distribution of eSports are nearly 100% digital, fans can stream eSports content for free anywhere in the world, unencumbered by traditional TV rights that for most Western-based pro sports leagues have been segmented by geography and are often lumped into an expensive cable subscription.

In short, we believe eSports are at the cross-section of some powerful trends: social connections being formed and maintained online, digital consumption of video, and global growth in the gaming audience. Looking ahead, we see numerous public and private investment opportunities that we believe will benefit from the structural growth of eSports, both in terms of audience and, increasingly, monetization, as the requisite infrastructure is built to transition eSports from the “Wild West” of sports to a full-fledged professional sport. **We summarize our key takeaways below.**

**The audience opportunity.** In 2018, we estimate the global monthly audience for eSports will reach 167mn people, based on data from NewZoo, larger than that of Major League Baseball and the National Hockey League. We estimate the total online population is over 3.65bn people globally, to go along with 2.2bn gamers, but eSports viewers represent just 5% of the online population TAM, which suggests that there should be plenty more runway for audience growth. By 2022, we estimate the eSports audience will reach 276mn, similar in size to the NFL today.

Due to the growing popularity of survival-based games Fortnite and PUBG, we believe eSports viewership is moving more into the mainstream, which should support a 14% audience growth CAGR for the next 5 years. Recently, Epic games announced that it would set aside \$100mn in prize pool for the first year of Fortnite eSports tournaments, nearly the size of the entire eSports prize pool in 2017. With growing incentives for

eSports players, and by extension more interest from the casual observer, we believe the eSports audience should continue to outpace the growth of traditional leagues.

**League infrastructure is creating meaningful opportunities for direct monetization.**

In the early years of eSports, there was little organization or infrastructure, and as a result, the massive audience of eSports did not translate into meaningful revenue streams for players, team owners, etc. But in 2017, Riot Games created the North American and EU League of Legends leagues, while in January of 2018, Blizzard launched the Overwatch League. We believe these leagues created the requisite infrastructure that will allow eSports to finally start to close the monetization gap relative to other established sports leagues.

In 2017, we estimate eSports generated \$655mn in annual revenue, including 38% from sponsorships, 14% from media rights, and 9% from ticket revenue. But by 2022, we expect media rights to reach 40% of total eSports revenue - comparable to the average of the four major Western sports leagues today - as massive audiences and associated revenue for established online video platforms like Twitch, YouTube, Douyu, and Huya will be able to support a growing pool of media rights fees paid to top publishers for their content. As media rights and sponsorship continue to grow, along with the formalization of pro sports leagues, we expect total eSports monetization will reach \$3bn by 2022.

**Exhibit 1: Our key estimates**

eSports audience, prize pool, and monetization (2018E-2022E)

	2018E	2019E	2020E	2021E	2022E
<b>Audience (mns)</b>	<b>167</b>	<b>194</b>	<b>225</b>	<b>250</b>	<b>276</b>
<i>y/y growth %</i>	17%	16%	16%	12%	10%
<b>Prize Pool (\$ mns)</b>	<b>\$170</b>	<b>\$256</b>	<b>\$307</b>	<b>\$359</b>	<b>\$413</b>
<i>y/y growth %</i>	50%	50%	20%	17%	15%
<b>Monetization (\$ mns)</b>	<b>\$869</b>	<b>\$1,184</b>	<b>\$1,592</b>	<b>\$2,173</b>	<b>\$2,963</b>
<i>y/y growth %</i>	33%	36%	35%	37%	36%

Source: Goldman Sachs Global Investment Research, Newzoo

**Fortnite and the “Moneymaker” effect.** In 2003, Chris Moneymaker, an accountant and amateur poker player from Tennessee, outlasted a field of 839 players to win the World Series of Poker. His victory sparked a meteoric rise in the popularity of online and tournament poker. Just 3 years after his victory, the first place prize money for the WSOP increased to \$12mn in 2006, up from \$2.5mn in 2003. The relevant lesson here is that Moneymaker elevated poker’s profile as a sport to the mainstream — and we believe Fortnite is doing the same thing for video games and eSports.

The Fortnite phenomenon has been well-documented, but by way of background, the title has reached more than 125mn players on across console, PC, and mobile. According to SuperData, as of April the game generated \$296mn of revenue across platforms, an annual run rate of \$3.6bn — more annual revenue than any major console or PC game today. As Fortnite brings more new gamers to the ecosystem, particularly those in younger demographics, we believe the eSports audience - and associated revenue streams - will benefit over time.

**A new paradigm for distribution.** Unlike traditional sports, the vast majority of eSports viewership is online, the same medium where multiplayer game play takes place and through which the eSports audience consumes media content. In the coming years, we believe eSports content (particularly live) will continue to grow in value, not only due to its audience reach but also the engagement it commands, creating an opportunity for advertisers to target a captive and young demographic.

In the West, we believe Twitch and YouTube Gaming are the primary distribution channels for live and recorded eSports content. Because Twitch captures 84% of live-streaming viewership in North America, we currently estimate that it over-indexes on revenue relative to YouTube, with 54% of gaming content gross revenue market share in 2017 relative to 22% for YouTube. There are three major monetization channels: advertising, tipping, and sponsorship. By 2022, we model eSports industry advertising revenue of \$429mn (25% 5-year CAGR), tipping revenue of \$372mn (24% 5-year CAGR), and sponsorship revenue of \$1.1bn (34% 5-year CAGR).

**Asia is leading the way for eSports globally.** China's eSports market is built upon the largest gamer base in the world, with approximately 442 million gamers as of 2017, a 57% penetration rate of Chinese internet users, according to CNNIC. By 2018, China will contribute one third of the global game industry's total revenue, according to NewZoo. For Asia more broadly, there are 89 million eSports viewers, according to NewZoo, roughly half of global audience in 2018E. We believe the popularity of eSports in this region could be a leading indicator of what is to come in Western markets, as markets like China and Korea already outpace the North America in some measures of technological change like smartphone penetration.

**Venture investment in eSports has stepped up meaningfully this year.** Since 2013, there has been \$3.3bn of venture capital investment in eSports-related start-ups. In 2018 YTD, we have already seen \$1.4bn of investment, a nearly 90% y/y increase from the total amount of funding in 2017. The uptick was largely driven by two outsized investments made by Tencent in Chinese online video platforms Douyu and Huya of \$630mn and \$461mn, respectively. We believe these investments in particular underscore two key trends: 1) the opportunity for live-streaming to monetize the growth in eSports in a way that few other eSports-related businesses can, and 2) the popularity of eSports in Asia in particular. In addition to the venture opportunity, **we outline our key public investment recommendations on the theme of eSports in the table below.**

#### Exhibit 2: Our top ideas for investing in eSports


Stock recommendations by region and sector

Stock	Region	Sector	Rating	PT	% Upside
ATVI	U.S.	Video Games	Buy	\$82	8%
EA	U.S.	Video Games	Buy	\$158	12%
AMZN	U.S.	Internet	Buy*	\$2,000	17%
LOGI	Europe	Hardware	Neutral	fr. 48	8%
NVDA	U.S.	Semis	Buy	\$310	24%
6758.T (Sony)	Japan	Technology	Buy*	¥7,500	37%
9697.T (Capcom)	Japan	Video Games	Buy	¥3,100	9%

\*Denotes that stock is also on the CL

Source: Goldman Sachs Global Investment Research

# eSports in Numbers



## The Audience


**276mn**  
The estimated size of the eSports audience in 2022E—up from 167mn viewers today who already outnumber the audiences of the NHL and MLB

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**58mn** Unique viewers of the 2017 League of Legends finals

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**125mn** The number of global players for Fortnite, the highest monetizing video game in the world




## The Demographics

**50%+**  
The share of eSports viewership coming from Asia. eSports penetration has reached only 5% in the region, but already comprises the lion's share of viewership

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**79%**  
The eSports audience under age 35




## The Engagement

**355bn**  
The total number of minutes watched on Twitch in 2017, up 22% year-over-year

---

**98 minutes**  
The amount of time active users on Chinese live-streaming platform Huya spend watching content every day on the mobile app



## The Monetization

**\$3bn**  
Our estimate for total eSports revenue in 2022E, up from \$655mn in 2017. We expect media rights will contribute nearly half of this amount

---

**\$296mn**  
Fortnite's revenue in April. The game is the most watched title on Twitch, with ~1.5x the average viewership of the 2<sup>nd</sup> most-watched title



## The Buy-In

**\$20mn**  
The price to buy one of the 12 Overwatch League teams for sale in 2017. We expect Activision (the IP owner) to sell 28 total teams, with future sales on the order of...

---

**\$40mn+**  
The price we expect potential owners to pay for the next 6 Overwatch League teams sold in 2018



## The Incentives

**\$100mn** PLAYERS  
The prize pool promised for the first year of Fortnite competitions, nearly the size of the *entire* eSports prize pool in 2017

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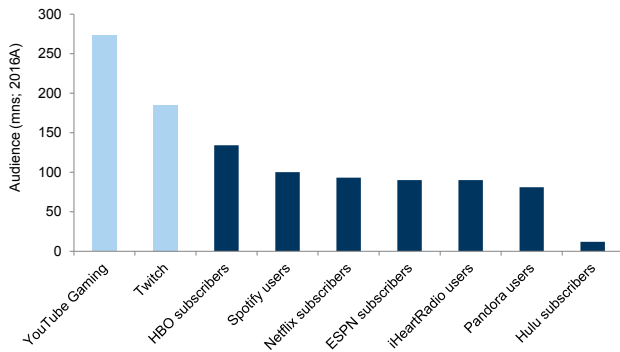
**\$500k** LIVE STREAMERS  
The monthly income of Ninja, an online personality who live-streams gameplay on Twitch

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# The Audience Opportunity

eSports have been around for as long as the video game industry itself, and collectively refer to competitive video game play by professional and amateur gamers. But in recent years, growth in the gaming audience and player engagement has elevated eSports into mainstream culture as a legitimate professional sport with a massive global following. In 2018, we estimate the global monthly audience for eSports will reach 167mn people, based on data from NewZoo, larger than that of Major League Baseball and the National Hockey League. By 2022, we estimate the eSports audience will reach 276mn, similar in size to the NFL today. Unlike many existing pro sports, the eSports audience is young, digital, and global: more than half of eSports viewers are in Asia, 79% of viewers are under 35 years old, and online video sites like Twitch and YouTube have a larger audience for gaming alone than HBO, Netflix and ESPN combined.

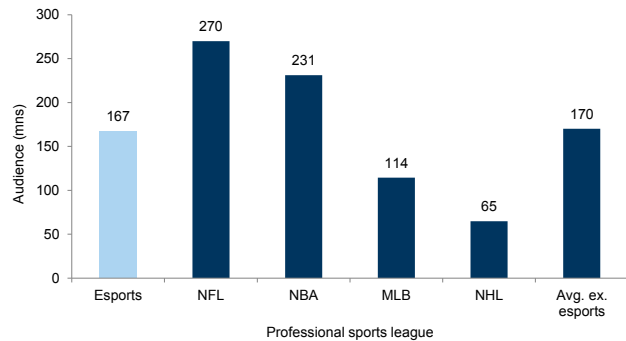
**Exhibit 3: Twitch and YouTube Gaming have a larger audience than many entertainment platforms**



Source: SuperData, Goldman Sachs Global Investment Research

**Exhibit 4: The eSports audience is similar to the average of large professional sports leagues**

Audience size by sports league (2017A)



Source: Nielsen, CBS, ESPN, Goldman Sachs Global Investment Research

In 2017, the world finals for one of the most popular eSports titles, League of Legends (LoL), attracted 58mn unique viewers, according to Riot Games. We assume total unique viewers for LoL are equal to total cumulative viewers for TV viewership, a metric that is used to describe a broadcast’s total unique audience. According to data from Nielsen and Rentrak, total cumulative viewership was as follows for major sports finals in 2017: The Super Bowl (124mn), League of Legends (58mn), The World Series (38mn), The NBA Finals (32mn), and the Stanley Cup Finals (11mn). It’s worth noting, however, that these audience figures for the traditional leagues are U.S.-only while the LoL figure is global. Therefore, the global audience figures for the traditional sports championships are likely higher than the numbers we show in Exhibit 5.

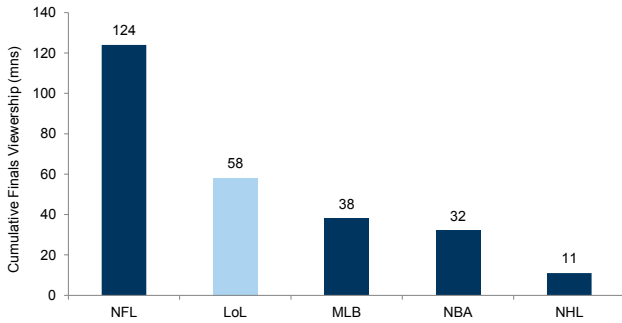
While established pro sports leagues are mostly watched through traditional media like TV, nearly all of the eSports audience is online, with the exception of some broadcasts that have taken place on ESPN and Turner networks. As measured by concurrent viewership, a recent live stream of Fortnite gameplay by celebrity Twitch personality Ninja attracted 628k concurrent viewers, almost double the average concurrent viewership of the NFL’s Thursday Night Football on Twitter and Amazon Prime (though that was a subset of overall TNF viewership). While traditional pro sports leagues in



many cases may need to shift their business models toward online distribution from TV to reach younger and international demographics, eSports is already reaching this audience in the West through OTT platforms like Twitch, YouTube Gaming, and in China through Douyu, Panda TV, and Huya, among others.

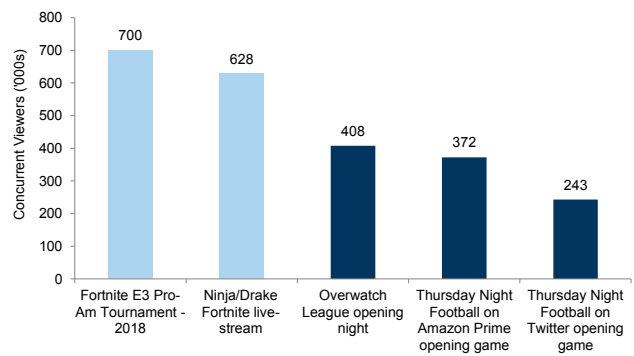
**Exhibit 5: We estimate LoL finals cumulative viewership was comparable to other major sports finals**

Cumulative finals viewership - NFL, LoL, MLB, NBA, and NHL (2017A)



Source: LoLesports.com, Goldman Sachs Global Investment Research, Nielsen, Rentrak

**Exhibit 6: The Overwatch World League's opening night viewership surpassed Thursday Night Football's streaming debuts**

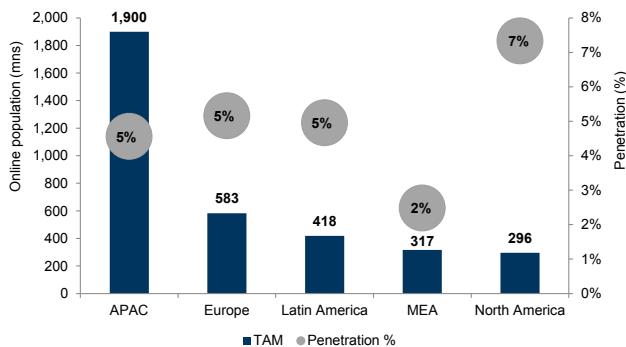


Source: Company data, Nielsen, ESPN, Goldman Sachs Global Investment Research

According to NewZoo, there are over 2.2bn active gamers globally. Today, the eSports audience represents just 5% of the total online gaming population, which suggests that there should be plenty more runway for eSports audience growth. Even in Asia, which contributes more than half of the global eSports audience, penetration is just 5%. As younger demographics increasingly communicate via online channels, and social interactions take place online, we believe eSports as an interactive and social form of sports viewership should continue to take share of traditional sports, thereby supporting a 14% 5-year audience growth CAGR.

**Exhibit 7: APAC's TAM is nearly 4x that of any other region**

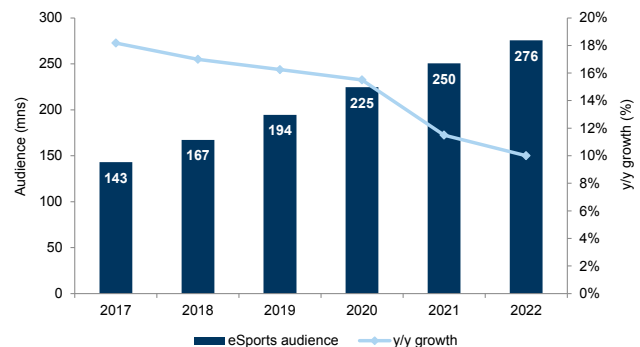
eSports TAM (online population; mns) and penetration (%)



Source: eMarketer, Goldman Sachs Global Investment Research

**Exhibit 8: We expect the eSports audience to grow at a 14% 5-year CAGR**

GS eSports audience growth forecast - 2017A to 2022E



Source: NewZoo, Goldman Sachs Global Investment Research

To support this audience growth, we believe there are a number of factors, including growth in the global gaming audience as well as the increasing prize pools of eSports, which we believe will continue to build interest among players and fans. Today, the biggest eSport in the world, as measured by prize money, is Dota 2. For the 2017 Dota 2



International, the total prize pool was \$23mn, but only \$1.6mn of that was contributed by Valve, the game’s publisher. The rest of the prize pool — more than \$21mn — was actually sourced through crowdfunding. We’d note that the total purse for the Dota 2 International exceeded Wimbledon (\$16mn for men’s / women’s singles separately, not combined), The Masters (\$11mn), and the Daytona 500 (\$18mn as of 2015 when figures were last provided).

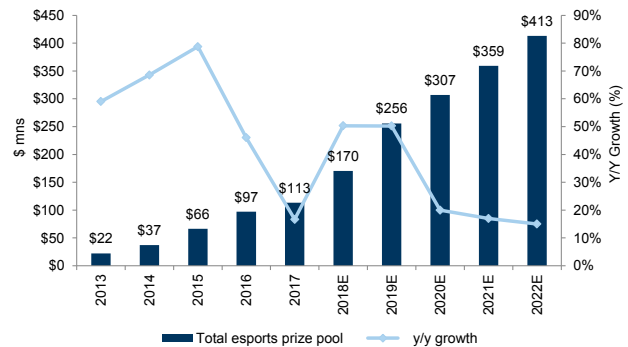
Recently, Epic Games announced that they planned to provide \$100mn in prize pool money for Fortnite eSports competitions in the first year of game play — nearly as much as the total \$113mn of prize pool awarded for all eSports in 2017. As a result, we expect total eSports prize pools to more than double in the next couple years, driving more players into eSports competition, not only in Fortnite but in all types of games. With higher stakes, we believe audiences will follow, giving us increased confidence in our eSports audience forecast of 276mn by 2022.

**Exhibit 9: Dota 2 has the largest prize pool of all eSports titles**  
eSports prize pool by title

Title	Prize Money (2017)	Tournaments
<b>Dota 2</b>	<b>\$38,053,795</b>	<b>159</b>
Counter-Strike: Global Offensive	\$19,252,556	894
League of Legends	\$12,060,789	153
Heroes of the Storm	\$4,783,333	31
Call of Duty: Infinite Warfare	\$4,027,895	72
Hearthstone	\$3,452,684	112
Overwatch	\$3,408,254	259
StarCraft II	\$3,386,454	612
Halo 5: Guardians	\$1,748,000	14
SMITE	\$1,567,900	8
Other Games	\$21,511,703	1,619
<b>Total</b>	<b>\$113,253,364</b>	<b>3,933</b>

Source: Goldman Sachs Global Investment Research

**Exhibit 10: We estimate the eSports prize pool will grow at a 30% 5-year CAGR between 2017 and 2022E**  
Total eSports prize pool



Source: Goldman Sachs Global Investment Research

## eSports Can Extend Franchise Life and Drive Audience & Engagement

Before discussing the potential for direct monetization of eSports leagues, we first examine the impact that eSports can have on audience & engagement for video games, an indirect benefit that can be a significant tailwind to monetization. For example, in Exhibit 12 below, we show the top 15 highest monetizing PC & console titles through in-game purchases, an indicator of player engagement with a game. Not surprisingly, 7 of those games are also top 15 eSports titles as measured by total prize money paid out to players. Therefore, we believe eSports can not only help to increase the audience of games through “free” marketing on OTT video platforms like Twitch & YouTube, but it can also drive player engagement, manifested through in-game purchases — a source of revenue that we believe will reach roughly half of total for the Western based publishers in 2019. Due to caps on prize pools in Japan, we also show the top 10 most watched games on Twitch in Exhibit 13, a similar list to the rankings by prize pool, but including the Japanese game Street Fighter, which was the 6th most watched game on Twitch in 2017, as measured by hours watched.

**Exhibit 11: Seven of the top 15 eSports titles...**

Top titles by eSports prize money (2017A)

Rank	Title	Prize Money	Year Since Initial Release
1	<b>Dota 2</b>	<b>\$38.0</b>	<b>5</b>
2	<b>Counter-Strike: Global Offensive</b>	<b>\$19.3</b>	<b>6</b>
3	<b>League of Legends</b>	<b>\$12.0</b>	<b>8</b>
4	Heroes of the Storm	\$4.8	3
5	<b>Call of Duty: Infinite Warfare</b>	<b>\$4.0</b>	<b>14</b>
6	<b>Hearthstone: Heroes of Warcraft</b>	<b>\$3.4</b>	<b>4</b>
7	<b>Overwatch</b>	<b>\$3.4</b>	<b>2</b>
8	StarCraft II	\$3.4	8
9	Halo 5: Guardians	\$1.7	2
10	H1Z1	\$1.6	3
11	CrossFire	\$1.5	11
12	Quake Champions	\$1.5	1
13	<b>FIFA 17</b>	<b>\$1.4</b>	<b>9</b>
14	Rocket League	\$1.4	3
15	Smite	\$1.2	4

Source: esportsearnings.com, Goldman Sachs Global Investment Research

**Exhibit 12: ...Are also among the top 15 highest monetizing PC & console titles in-game**

Top titles by in-game revenue (2017A); FIFA, GTA, CoD, OW, Tom Clancy, and Assassin's Creed are GS estimates; all others are SuperData

Rank	Title	2017 in-game revenue (\$ mns)	Year Since Initial Release
1	<b>League of Legends</b>	<b>\$2,100</b>	<b>8</b>
2	Dungeon Fighter Online	\$1,600	8
3	Crossfire	\$1,400	11
4	<b>FIFA franchise</b>	<b>\$868</b>	<b>9</b>
5	GTA franchise	\$622	20
6	<b>Call of Duty franchise</b>	<b>\$478</b>	<b>14</b>
7	World of Tanks	\$471	8
8	<b>Dota 2</b>	<b>\$406</b>	<b>5</b>
9	Roblox	\$310	12
10	MapleStory	\$279	15
11	<b>Counter-Strike: Global Offensive</b>	<b>\$221</b>	<b>6</b>
12	<b>Hearthstone (PC Only)</b>	<b>\$217</b>	<b>4</b>
13	<b>Overwatch</b>	<b>\$211</b>	<b>2</b>
14	Tom Clancy franchise	\$197	10
15	Assassin's Creed	\$137	10

Source: Goldman Sachs Global Investment Research, Company data, SuperData

**Exhibit 13: Japanese games such as Street Fighter ranked in the top 10 games on Twitch as measured by eSports hours watched in December 2017**

Top 10 games on Twitch by eSports hours watched - global - December 2017

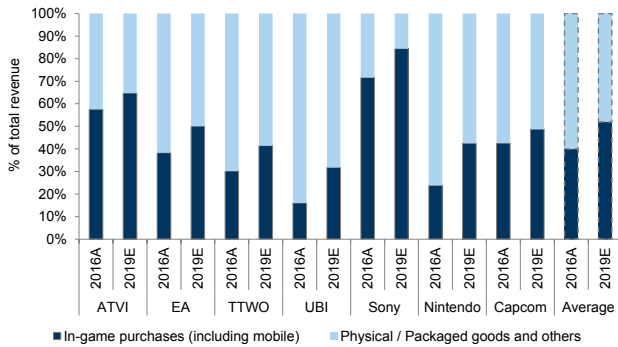
Game Title	Total Hours (mns)	Esports Hours (mns)	Share Esports (%)
Dota 2	32.4	11.8	36%
CS: GO	18.8	6.8	36%
League of Legends	69.6	6.2	9%
Hearthstone	43.2	4.5	10%
CoD: WWII	6.9	1.6	24%
Street Fighter V	2.7	1.4	54%
StarCraft II	3.7	1	26%
Overwatch	17.9	0.7	4%
Rocket League	2.3	0.6	26%
Super Smash Bros.	0.9	0.6	68%

Source: NewZoo

Also of note, the top eSports titles by prize pool have been around for an average of 5 years, and while this is largely because publishers are constantly updating these titles with fresh content to keep players engaged, we believe eSports also play a part. To the extent that eSports can maintain or grow player interest through regular tournaments and online viewership, we believe that can extend the life-cycle of games and in some cases can even accelerate in-game monetization. As an example, EA launched an eSports mode for FIFA 18 called FIFA Ultimate Team Champions in June 2017 ([link](#)), which drove 5x the player engagement as regular Ultimate Team mode. As a result, an acceleration in Ultimate Team growth in the F3Q18 caused overall live services growth to reach +39% y/y, up from +22% in the F2Q and 15% in FY17. The quarterly live service growth — an absolute y/y increase of \$221mn — was the fastest for EA in 3 years, and mostly attributable to eSports, in our view.

**Exhibit 14: In-game revenue (including mobile) should reach 52% of total revenue on average in 2019E**

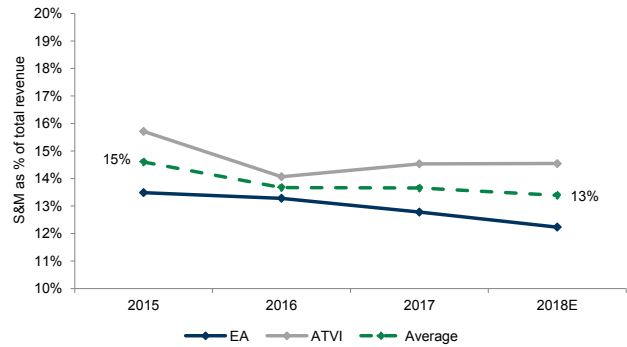
In-game revenue as a % of total revenue by publisher (including mobile)



Source: Company data, Goldman Sachs Global Investment Research

**Exhibit 15: Sales & Marketing as a % of revenue is declining for ATVI/EA**

Sales & Marketing as % of total revenue (2015A to 2018E) - ATVI, EA, and Average



Source: Company data, Goldman Sachs Global Investment Research

Lastly, we believe eSports will ultimately lower the cost of customer acquisition for games. To the extent that a title has a regular eSports presence, which can yield millions of monthly views, we believe it can ultimately save publishers on the cost of customer acquisition. As an example, the Overwatch League launched with 10mn viewers in its opening weekend, while the latest FIFA Champions Cup tournament had 17mn views online. To otherwise reach 10mn viewers would cost an estimated ~\$300k for a minute long ad, but through eSports a publisher can reach an audience of 10mn+ viewers for hours at a time at little to no cost. While there is typically noise in sales & marketing spend for major publishers around major game releases, we expect the general trend will be lower in the next 5 years, as has been the case in the last 5 (see Exhibit 15).

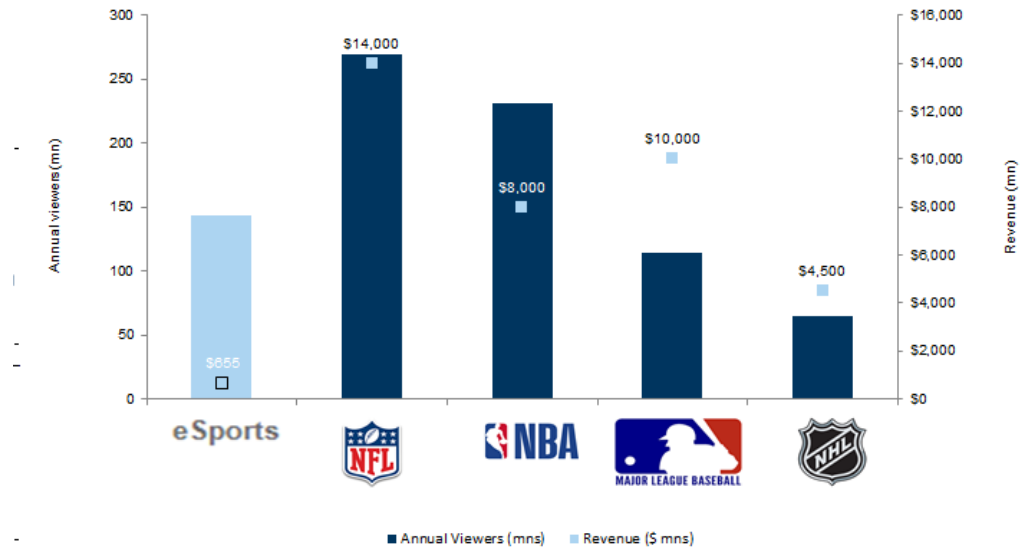
**League Infrastructure Will Create Opportunities for Direct Monetization**

Historically, eSports has been the Wild West of sports; it has lacked the organization, structure, and revenue streams of established leagues. We believe the lack of structure is attributable to the fragmentation of IP, each of which is technically its own “sport.” Unlike professional football, a single sport that attracts an estimated audience of 270mn globally, eSports represents hundreds of video game IPs that collectively attract an audience of 167mn globally. While some publishers own several popular eSports titles, the viewership associated with these titles is still a subset of the global eSports audience. A traditional sports league like the NFL can collectively bargain for media rights on behalf of its various teams, but eSports as an entity cannot do the same for all of its IP.

eSports is more global than traditional sports; the audience is more geographically dispersed relative to MLB or the NHL, for instance, which have more audience concentration in North America. For traditional sports leagues, we believe the audience concentration in local US markets has helped to drive local revenue streams: ticketing, concessions, merchandise — and in some cases, regional media rights, as is true with MLB. On average, local revenue makes up 54% of revenue for traditional sports

leagues, with the NHL indexing the highest at 73% of total. While regional eSports tournaments have generated local revenue streams — tickets sales, concessions, etc — typically that revenue has gone towards paying the third-party event organizer and prize pool for the players, the size of which is crucial for attracting top teams and audiences. All of this is to say that eSports has under-monetized relative to its audience potential, but we believe that is finally starting to change.

**Exhibit 16: eSports dramatically under-index on monetization relative to established sports leagues**  
Annual viewership (mn) and revenue (\$mn) for eSports and professional sports leagues, 2017A

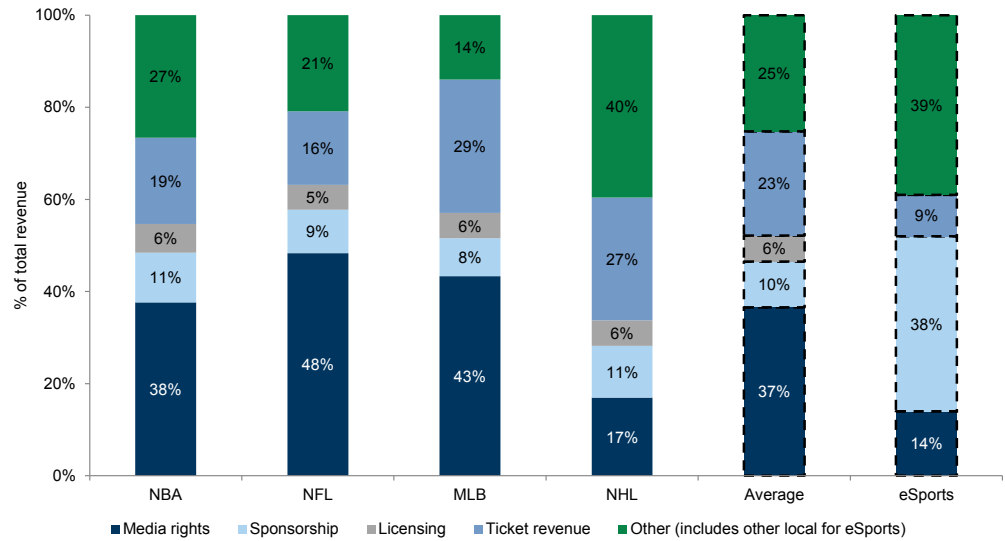


Source: eSports annual viewership and revenue from NewZoo; shows enthusiasts only, Marketwatch, CBS, Forbes, Goldman Sachs Global Investment Research

In 2017, we estimate eSports generated \$655mn in annual revenue, and in the past 5 years revenue has grown at a 38% CAGR, according to data from NewZoo. Of the \$655mn in revenue, we estimate 38% came from sponsorships, 14% from media rights, and 9% from ticket revenue. Given the fragmentation of audience globally, we believe media rights, sponsorship, advertising, and in-game monetization will be the largest contributor to total revenue to eSports leagues at scale. On average today, the four largest pro sports leagues in the West generate 37% of revenue from media rights, 23% from ticket sales, 10% from sponsorship, and only 6% from licensing.

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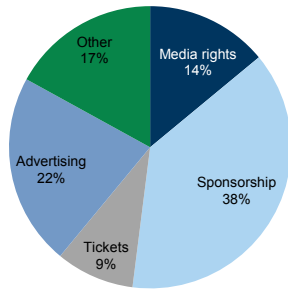
**Exhibit 17: 37% of revenue in traditional professional sports is derived from media rights**  
 Revenue breakdown for the NBA, NFL, MLB, NHL (2017A), and eSports (2017A)



Source: Goldman Sachs Global Investment Research, Sports Business Daily, New York Times, Wall Street Journal, CBSSports, ESPN, Forbes, MLB.com, Liberty Media

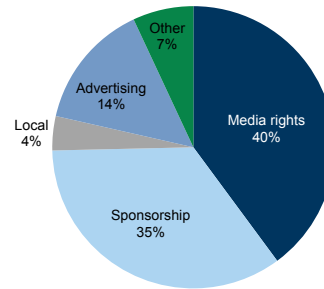
By 2022, we believe eSports revenue streams will look much different than they do today. While sponsorships make up the largest percentage of global revenue today, we believe media rights will eventually become the largest source of eSports revenue, as massive audiences and associated ad revenue for established online video platforms like Twitch, YouTube, Douyu, and Huya will be able to support a growing pool of media rights fees paid to top publishers for their content. In 2022, we expect media rights to reach 40% of total eSports revenue, comparable to the average of the four major Western sports leagues today. We have already seen a few landmark deals in the last couple of years. In December 2016, Bantech entered into a seven year, \$300mn deal with Riot Games to distribute League of Legends content. And in January 2018, Twitch signed an exclusive, 2-year deal with the Overwatch League for \$45mn / year, according to Sports Business Daily. As the eSports audience continues to grow, and more league infrastructure continues to improve, we expect to see more deals like this in the future.

**Exhibit 18: Advertising and sponsorship are the largest sources of eSports revenue today**  
eSports revenue by type (2017A)



Source: NewZoo

**Exhibit 19: ...but we see media rights as the largest revenue opportunity in 2022E**  
eSports revenue streams (2022E)



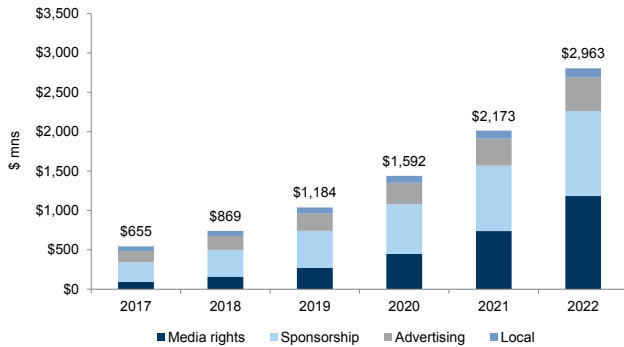
Source: Goldman Sachs Global Investment Research

After media rights, we expect sponsorship will become the second largest contributor of revenue, at 35% of total in 2022. Historically, sponsorships in eSports were mostly limited to endemic sponsors, like hardware manufacturers. But in the last couple of years, we have seen more mainstream subscribers enter the fray, eager to reach the millennial & Gen Z audience of eSports. Sponsors for the League of Legends League include Geico, State Farm, Nissan, Axe, and Coca-Cola, while the Overwatch League is sponsored by Toyota, Sour Patch Kids, Intel, and T-Mobile. And it was only after Riot and Blizzard created established leagues that we started to see the landscape for sponsorship change.

As league infrastructure develops for more games, we expect to see a step function change in monetization for eSports. Today, we estimate eSports generates close to \$655mn in revenue, but by 2022, we expect that figure will reach \$2.96bn, based on a bottoms up analysis (see the section “A New Paradigm for Distribution” for more detail on our estimates). We continue to believe that eSports will under-index on monetization relative to the size of its audience, given the structural difference between it and traditional sports leagues — namely, that there is fragmentation of IP across eSports and therefore it’s challenging for any one eSports league to have the same audience scale and bargaining power as the NFL or NBA, for instance. That being said, we still see an enormous opportunity for eSports to close the monetization gap, given our expectation for a 35% 5-year CAGR for total eSports revenue between 2017 and 2022.

**Exhibit 20: We forecast eSports revenue growing at a 35% 5-year CAGR through 2022E**

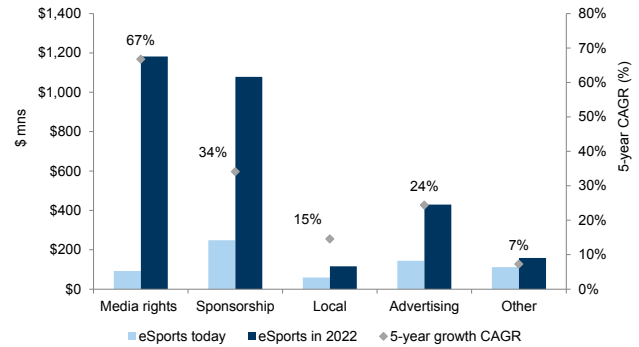
GS eSports revenue growth forecast (2017A to 2022E)



Source: Goldman Sachs Global Investment Research, NewZoo, SuperData

**Exhibit 21: We forecast media rights revenue will grow at a 67% 5-year CAGR, driving overall eSports revenue growth**

GS eSports revenue growth forecast and 5-year revenue stream growth CAGRs



Source: Goldman Sachs Global Investment Research, NewZoo, Superdata

**Activision and Tencent changed the game**

Overwatch is a team-based, multi-player, first-person-shooter video game published by Blizzard Entertainment, a subsidiary of Activision Blizzard.

League of Legends is a multi-player online battle arena (MOBA) video game published by Riot Games, which is majority-owned by Tencent.

In 2017, Riot Games created the North American and EU League of Legends leagues, while in January of 2018, Blizzard launched the Overwatch League. We believe these leagues helped to create a blueprint for what an eSports league could be, as they created an infrastructure that will allow eSports to finally start to close the monetization gap relative to other established sports leagues. We detail the key attributes of the leagues below.

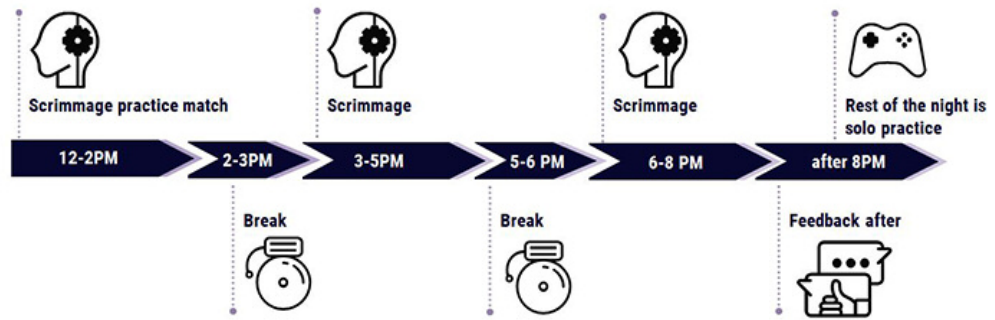
- **IP Ownership.** Both Activision and Tencent (through Riot Games) own the IP around which the leagues are formed. This gives them the ability to control the structure of the league and participate in league revenue streams, along with team owners. Also, both Activision and Tencent sold teams to investors - \$20mn / team (link) for the initial cohort of teams for the Overwatch League and \$10mn / team for LoL North America League - which raised the revenue necessary to build league infrastructure. Generally, both Activision and Tencent targeted team owners that are current owners of other pro sports teams (Robert Kraft, Jeff Wilpon, etc), to leverage their knowledge of how to generate local revenue streams, which along with national distribution / sponsorship revenue can help to generate financial returns.
- **No relegation.** In past iterations of eSports leagues, teams were not guaranteed a fixed spot in the league; if a team was underperforming, it could be replaced without recourse - a process known as relegation. Importantly, the team sales for OWL and the LoL leagues guaranteed permanent spots in the league for owners, as is true for all major sports leagues in North America. Also, each team has a permanent regional home, which should help generate local fan interest and create opportunities for the local revenue streams that on average represent 53% of major sports league revenue.
- **Player salaries.** In addition to having teams in fixed locations, players are also guaranteed salaries, which makes it easier for those players to stay with a team and train for gameplay, as opposed to the prior model of just playing for prize money



with mixed results. We believe the prospect of salaries will attract more aspiring eSports players to the pro ranks, increasing the quality of gameplay and fan interest.

- Media rights. With the creation of established eSports leagues, we have seen two landmark distribution deals. Riot games signed a 7-year, \$300mn deal with BAMTech to distribute League of Legends games. Activision signed a two-year \$90mn deal with Twitch to distribute the Overwatch League in North America. In China, Activision signed non-exclusive deals with ZhanQi TV, Panda TV, and NetEase CC for an undisclosed amount (likely much less than the Twitch deal, given non-exclusive terms).
- Local sponsorship. Overwatch League now has five major sponsors, including Toyota, HP, Intel, T-Mobile, and Sour Patch Kids, while the North American League of Legends League has sponsorship agreements with Geico, Nissan, and Axe. Other than distribution, we believe sponsorship will be the next largest contributor to league-level revenue. About 79% of the eSports audience is below the age of 35, according to data from NewZoo, making it a coveted demographic for brands. We have been very encouraged to see sponsorship move from just endemic brands (e.g. PC/console hardware manufactures) to major consumer brands in key verticals like automotive and consumer products. Increasingly, we believe Chief Marketing Officers (CMOs) will take notice of the growing eSports audience, and will seek out exposure through local and league-level sponsorship deals.
- In-game revenue. Lastly, we believe the leagues will also be able to generate revenue through in-game monetization. Aside from eSports, we expect in-game monetization will reach ~50% of total industry revenue by 2019, as video game publishers have invested in long-term player engagement through regular content updates, thereby creating opportunities for player investment in game. We believe eSports will be another driver of engagement for players, and for the Overwatch League, we expect Activision will sell virtual items associated with League events, another source of league revenue.

We believe these leagues have done well to build the necessary infrastructure capable of attracting stable sources of revenue over the long-term. Increasingly, we believe more IP owners for top eSports titles will build leagues to better monetize the audiences that they regularly attract. In the next 5 years, we expect to see a handful of discrete eSports leagues for major titles, while for smaller titles, independent tournament organizers like ESL will continue to organize events. We believe publishers of smaller eSports titles can still realize the indirect benefits of free marketing and increased player engagement, without the direct revenue streams from a formal league.

**Exhibit 22: A day in the life of a professional gamer**

Source: Goldman Sachs Global Investment Research

**Pro sports leagues are investing in eSports as well**

For sports video games, we expect a slightly different eSports league structure to evolve, since the IP is licensed by the league to the game developer. In this structure, the leagues, the game developers, and the team owners all share the various revenue streams. Because the dollars are split among three parties (not just two), we think the direct monetization opportunity for game developers will be less than it is for other developers that own the IP. Even so, we believe there will be a marketing benefit for the sports league and the game developer. For the league, we believe eSports events can help to keep fans engaged during the offseason, while for the developers, regular eSports tournaments can further grow audience, engagement, and ultimately, monetization.

In the past year, both the NFL and NBA have announced plans to formalize their eSports efforts. In February 2017, the NBA and Take Two announced a partnership to form an eSports league for *NBA 2K*. Under the agreement, the Association's 30 franchises were given the option to form and manage teams, and seventeen teams elected to participate in the inaugural season, consistent with the league's goal of having half the teams participate in the first season before growing to include all thirty teams thereafter. While financial terms were not disclosed, the Wall Street Journal reports that the league "will operate much like the NBA, with expenses that will include player salaries, marketing, product licensing and more." In April 2018, the NBA announced an exclusive broadcast deal with Twitch to live-stream all 199 games of the League's inaugural season. While specific terms of the deal were not disclosed, Bloomberg reported (link) that the deal is multi-year with exclusive live-streaming rights through the first season (link). Twitch plans to work with the NBA to build interactive features for the league broadcasts, which should help to drive engagement.

In April 2017, the NFL announced that in partnership with EA it planned to air exclusive broadcasts of the EA Sports Madden NFL 18 Championship and the Madden NFL 18 Ultimate League on a number of Disney networks. The league ran from February 2<sup>nd</sup>, 2018 until the start of the NFL draft on April 28<sup>th</sup>. The games aired on a variety of channels, including ESPNNews, ESPN2 / Deportes, and ESPN2 (link). Because Madden is a licensed IP, we believe the distribution revenue from the league was split between the

NFL and EA, and is unlikely to be meaningful to EA from a financial perspective. However, we believe the Madden league will help to drive audience and engagement, both for the game itself and perhaps for NFL viewership as well. We expect EA will monetize engagement with the league through Ultimate Team, and for the NFL, we believe televised eSports game play helped to promote the NFL brand between the end of the season and before the draft. Indeed, this year's NFL draft had the highest viewership on record at 5.5mn average viewers, and while there were other factors that may have contributed, like controversy around top draft picks, we nevertheless think eSports likely played a part.

### Exhibit 23: On average, total TV viewership for Madden eSports events has been around 313k

Madden eSports TV ratings (2017A-1Q18A)

Date	Network	Program	Total Viewers ('000s)
4/28/2018	ESPN2	Madden Bowl	128
2/1/2018	ESPN2	Madden Club Championship	265
12/27/2017	CW	Madden Challenge	670
2/3/2017	NFL Network	Madden Bowl	190
<b>Average viewership</b>			<b>313</b>

Source: The Next Level, data compiled by Goldman Sachs Global Investment Research

### Exhibit 24: The 2018 NFL Draft had the highest average viewership of any draft on record

Average NFL Draft viewership - 2014 to 2018

NFL Draft	2014	2015	2016	2017	2018
Average viewers (mns)	5.4	4.1	4.3	4.6	5.5
y/y growth%		-24%	5%	6%	20%

Source: CNN, Nielson, Bleacher Report

## The Overwatch League Case Study

We believe the Overwatch League represents a departure from most traditional sports leagues, where the vast majority of league-level profits are dispersed to team owners. Because Activision Blizzard owns the Overwatch IP, we believe they will share league-level profits equitably with team owners, while local revenue streams from merchandise, tickets, and concessions will remain with the team owners. Also, as a brand new league, we believe the Overwatch League will be able to reach - and monetize - a global, online, and fragmented audience, without having to undergo any shift in business model. In the section below, we detail our League-level estimates, the various sources of revenue for the League, and how we expect profits will be shared.

### Exhibit 25: Our Overwatch World League revenue and profitability estimates

Overwatch League bottoms-up build (2018 to 2023E); (\$ mns)

	2018	2019	2020	2021	2022	2023
<b>Overwatch League Revenue</b>	<b>\$135</b>	<b>\$174</b>	<b>\$229</b>	<b>\$239</b>	<b>\$288</b>	<b>\$300</b>
y/y growth		29%	31%	5%	20%	4%
Owner-only Revenue (local revenue)	\$0	\$0	\$7	\$7	\$8	\$11
Activision-only Revenue (team sales)	\$34	\$73	\$99	\$127	\$141	\$141
Margin (for shared revenue)	5%	20%	30%	40%	40%	40%
League operating expenses	\$128	\$139	\$160	\$144	\$173	\$180
y/y growth		300%	50%	33%	0%	0%
League profit	\$7	\$35	\$69	\$96	\$115	\$120
Split between owners / Activision	50%	50%	50%	50%	50%	50%
Activision share of operating profit (\$mns)	\$3	\$17	\$34	\$48	\$58	\$60
<b>Total Activision OI (including team sales)</b>	<b>\$38</b>	<b>\$90</b>	<b>\$133</b>	<b>\$175</b>	<b>\$199</b>	<b>\$201</b>
y/y growth		140%	47%	32%	14%	1%

Source: Company data, Goldman Sachs Global Investment Research

## Our key assumptions for revenue

Distribution. This revenue stream includes the rights for OTT platforms to distribute Overwatch League events in various geographies across the world. Distribution revenue is part of League-level revenue, which is then netted against League-level costs before profits are shared 50/50 between the League and team owners. Late last year, the Overwatch League entered into a two-year exclusive rights deal with Twitch to distribute live broadcasts, valued at roughly \$45mn per year, according to Sports Business Daily, to go along with a \$30mn performance bonus that we believe was awarded in 2018E based on viewership hurdles. For China, the OWL also has a distribution deal in place with ZhanQi TV, NetEase CC, and Panda TV, which we assume is worth closer to \$10mn / year, a significant discount to the US deal as the rights were not sold on an exclusive basis. Therefore, we estimate total distribution revenue for the League of \$85mn in 2018E.

While longer-term we expect advertising revenue will develop as an important contributor to League-level revenue, in the near-term we reflect this revenue stream in Distribution revenue. Given the size of the rights deal with Twitch, we believe it very likely includes fixed contribution from ad revenue as well. Over time, we believe it's possible that ad revenue might be incremental to media rights, but for now, we don't think that's the case.

Sponsorship. Sponsorship encompasses revenue earned from major brands that are featured in League events. To date, the League has five sponsors — HP, Intel, Toyota, T-Mobile, and Sour Patch Kids — and by the end of 2018 we expect the League will have a total of six sponsors. We assume \$7.5mn in average annual revenue per sponsor, implying that in 2018 League-level sponsorship revenue will reach \$45mn. Similar to Distribution, this revenue stream flows into League-level shared revenue, which is then netted against League-level costs before profit is ultimately distributed between the League and team owners.

Local. Local revenue includes ticket sales, concessions, and local merchandise for the teams. In 2018, all of the regular season league events will take place at the Blizzard Arena in Burbank, California — not at the respective home cities of each team — and therefore we account for local revenue as League-level revenue. The finals will take place at the Barclays Center in Brooklyn, and because this is not a locally-owned arena, we include associated revenue in our League-level calculation as well. In 2020 and beyond, however, we assume that live events will move to locally-owned venues, at which point we expect all local revenue will be retained by owners.

In-game (League-level only). In-game revenue for the Overwatch League includes League-related virtual items. For instance, this revenue stream includes Overwatch League uniform skins, something Activision announced in December 2017 ([link](#)). Similar to National Merchandise, Distribution, and Sponsorship revenue, this revenue is captured at the League-level, netted against League-level costs, and is then shared with team owners.

In-game cheering. Cheering refers to revenue earned on Twitch from the gifting of virtual emojis. When watching a live stream on Twitch, users can buy animated chat emojis called “bits” to give live shout-outs to players. The feature was launched on Twitch in June 2016 and introduced to the Overwatch League streams in February of this year. Press reports indicate that the revenue from Cheering on Twitch is shared between the platform and the League, although at this point Activision has not disclosed the exact split. However, we do not roll this revenue stream into League-level revenue in our model, as we believe cheering revenue, like advertising, is incorporated into the 2-year distribution rights deal with Twitch. Over time, we believe this revenue stream, along with in-game purchases, could have the most upside to our model.

Team sales. In 2017, before the kick-off of the league, Activision sold 12 franchises for \$20mn a piece, according to ESPN. As the IP owner, this revenue will of course not be shared and will flow directly to Activision. At scale, we believe Activision aspires to have 28 teams in the league, and we expect to see more team sales going forward, perhaps at a higher price than the original teams sold for. In 2018, we are modeling another six OWL team sales at \$45mn a piece. From an accounting perspective, we believe team sale revenue is recognized ratably over a 7-year time frame, and we flow it through our model accordingly.

**Exhibit 26: We see Distribution as the largest revenue stream in 2023E**

Overwatch League revenue detail (2018E to 2023E); \$ in mns

Revenue Bucket	2018E	2019E	2020E	2021E	2022E	2023E	5-year CAGR
<b><u>Distribution / Advertising revenue</u></b>							
Distribution	\$85.0	\$85.0	\$135.0	\$135.0	\$175.0	\$175.0	16%
<i>y/y growth%</i>		0%	59%	0%	30%	0%	
<b>Total Distribution / Advertising revenue</b>	<b>\$85.0</b>	<b>\$85.0</b>	<b>\$135.0</b>	<b>\$135.0</b>	<b>\$175.0</b>	<b>\$175.0</b>	<b>16%</b>
<i>y/y growth%</i>		0%	59%	0%	30%	0%	
<b><u>Local revenue</u></b>							
Ticket sales	\$1.8	\$1.8	\$3.7	\$3.8	\$4.3	\$7.5	33%
<i>y/y growth%</i>		-2%	108%	3%	14%	73%	
Concessions and local merch	\$2.4	\$2.5	\$3.2	\$3.3	\$3.3	\$3.3	6%
<i>y/y growth%</i>		3%	28%	3%	0%	0%	
<b>Total Local revenue</b>			<b>\$6.9</b>	<b>\$7.1</b>	<b>\$7.6</b>	<b>\$10.8</b>	<b>nm</b>
<i>y/y growth%</i>				3%	8%	41%	
<b><u>Other League-level revenue</u></b>							
Sponsorship	\$45.0	\$60.0	\$67.5	\$75.0	\$82.5	\$90.0	15%
<i>y/y growth%</i>		33%	13%	11%	10%	9%	
In-game revenue (League-level only)	\$0.0	\$24.0	\$25.2	\$28.2	\$29.6	\$33.1	nm
<i>y/y growth%</i>		nm	5%	12%	5%	12%	
National Merch	\$0.5	\$0.9	\$1.1	\$1.2	\$1.4	\$1.5	24%
<i>y/y growth%</i>		65%	25%	15%	10%	10%	
<b>Total Other League-level revenue</b>	<b>\$45.5</b>	<b>\$84.9</b>	<b>\$93.8</b>	<b>\$104.5</b>	<b>\$113.5</b>	<b>\$124.6</b>	<b>22%</b>
<i>y/y growth%</i>		86%	11%	11%	9%	10%	
<b>Total Overwatch League revenue</b>	<b>\$134.8</b>	<b>\$174.1</b>	<b>\$228.8</b>	<b>\$239.5</b>	<b>\$288.5</b>	<b>\$299.6</b>	<b>17%</b>
<i>y/y growth%</i>		29%	31%	5%	20%	4%	
<b><u>Activision-only revenue</u></b>							
Team Sales	\$34.3	\$72.9	\$98.6	\$127.1	\$141.4	\$141.4	33%
<i>y/y growth%</i>		113%	35%	29%	11%	0%	
Cash recognition of team sales	\$270.0	\$180.0	\$200.0	\$100.0	\$0.0	\$0.0	nm
<i>y/y growth%</i>		-33%	11%	-50%	-100%		
<b>Total Activision-only revenue</b>	<b>\$34.3</b>	<b>\$72.9</b>	<b>\$98.6</b>	<b>\$127.1</b>	<b>\$141.4</b>	<b>\$141.4</b>	<b>33%</b>
<i>y/y growth%</i>		113%	35%	29%	11%	0%	

Source: Goldman Sachs Global Investment Research

**Our assumptions for profit sharing**

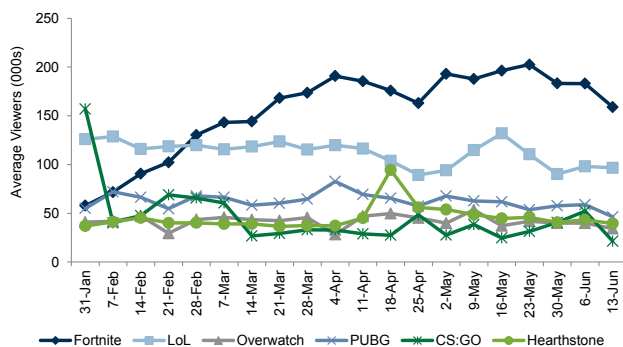
For League-level revenue, we include contributions from Distribution, Sponsorship, National Merchandise, and OWL in-game revenue. Starting in 2020, we assume all local revenue — ticket sales, concessions, and merchandise associated with League-related live events — is retained by the owners. For 2018, we expect the League will earn \$135mn in shared revenue, and we assume a 5% margin, consistent with Activision management commentary that the League will be “profitable” in 2018. Accordingly, we estimate \$128mn in League-level expenses in 2018, and \$7mn in League-level profit. We then add back team sales revenue to this estimate, implying that all-in Activision’s total OI (including team sales) will be \$38mn in 2018. By 2023, we estimate League OI will reach \$120mn, while total Activision OI from the league (including team sales) will be \$201mn.

# Fortnite and the “Moneymaker Effect”

The Fortnite phenomenon has been well-documented, but by way of background, the title has reached more than 125mn players on across console, PC, and mobile. According to SuperData, as of April, the game generated \$296mn of revenue across platforms, an annual run rate of \$3.6bn — more annual revenue than any major console or PC game today. We believe there are many reasons for why Fortnite has reached such an enormous scale. First and foremost, the game is part of the immensely popular battle royale genre, a survival-based game mode that appeals to a broad set of gamers, both skilled and amateur. Second, there is a building feature in the game, something that has already proven to be very popular among younger demographics in games like Minecraft, the 2nd best selling video game of all time. Third, the game is free-to-play, breaking the mold from most console games that have an upfront retail price of \$60. By eliminating the upfront cost, we believe the title was able to reach a far larger audience than a paid game could ever reach, and in particular, appealed to younger demographics without the disposable income of older gamers.

However, we believe there is a fourth, and under-appreciated, explanation for Fortnite’s rise: live-streaming. In addition to being the largest fully cross-platform game in the world, Fortnite is currently the most popular game on the live-streaming site Twitch, and as engagement grew on Twitch, so too did the number of players and monthly revenue. In addition to the mechanics of the game, we believe Fortnite was particularly adept at integrating pop culture features and tributes into gameplay to drive mass market interest. Popular dance move emotes in the game include Vine-derived “Best Mates,” the Robot dance, Carlton’s dance from ‘The Fresh Prince of Bel-Air’, and Turk’s famous dance from ‘Scrubs.’ Also, Fortnite gameplay was regularly streamed by top Twitch personality, Ninja, whose feed of Fortnite streams broke the record for the most concurrent viewers ever on an individual’s channel.

**Exhibit 27: Fortnite is currently the most popular game on Twitch**  
Weekly average viewership for Fortnite, LoL, Overwatch, PUBG, CS:GO, and Hearthstone on Twitch (1/31/18 to 6/13/18)



Source: TwitchMetrics.net, data compiled by Goldman Sachs Global Investment Research

**Exhibit 28: Ninja’s stream of Fortnite is the highest ever for an individual’s channel**

Top 10 peak concurrent streams of all time on Twitch

Rank	Streamer	Peak Concurrents ('000s)	Game association
1	ninja	628	Fortnite
2	lolitofdez	418	League of Legends
3	loltyler1	382	League of Legends
4	DrDisrespectLive	365	PUBG / Fortnite
5	DreamHackCS	214	CS:GO
6	FernanFloo	202	Fortnite
7	Dota2RuHub	197	Dota 2
8	LoganPaulWastaken	193	Fortnite
9	Epicenter_RU	192	Fortnite / CS:GO
10	PGL_Dota2RU	189	Dota 2

Source: TwitchStats.net, data compiled by Goldman Sachs Global Investment Research

Fortnite is very much a live game, with weekly updates to gameplay that drive consistent player engagement. As players look to complete a challenge, often they will go to Twitch or YouTube and check out how an influencer like Ninja was able to do it.



Most recently, Epic hosted a Fortnite Celebrity Pro-Am Tournament at E3, featuring 50 teams of two (one Pro, one Amateur celebrity per team) competing for a \$3 million dollar charity prize pool. The 3-hour long event included popular game streamers, athletes, musical artists, and actors. At its peak, the tournament attracted 700,000 concurrent viewers on Twitch, surpassing Ninja's record live-stream with Drake a couple months ago. While there were many reasons for Fortnite's initial success, we believe streaming has clearly helped to sustain interest in the title and further grow the audience. Therefore, we see streaming — and really eSports in general — as something that can amplify the success of a game.

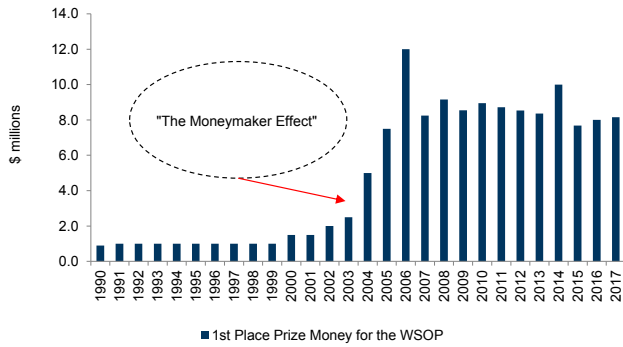
### **The Moneymaker Effect**

In 2003, Chris Moneymaker, an accountant and amateur poker player from Tennessee, outlasted a field of 839 players to win the World Series of Poker. Making his victory even more improbable, Moneymaker initially qualified through an online satellite tournament with an \$86 buy-in, well less than the typical \$10,000 entry fee for the main event. Up until that point, the WSOP champion was typically a well-established professional player, but with Moneymaker's victory, he gave hope to amateur players that they too could win the World Series of Poker and (at the time) a \$2.5mn first place prize. We believe the "anyone can win" mentality reverberated across the online poker community and sparked the meteoric rise of both online and live poker across the world. After his victory, the first place prize money for the WSOP increased exponentially, reaching \$12mn in 2006, just 3 years after his victory. We believe the relevant lesson here is that Moneymaker elevated poker's profile as a sport to the mainstream.

We believe Fortnite is doing the same thing for video games and eSports. Many competitive video games can be very difficult to play and even intimidating for new gamers to participate in multiplayer formats. But with Fortnite, we believe the game format of battle royale is actually quite appealing to amateur gamers who can still enjoy playing against more talented players by hiding out in the map, or being part of a team that can support them. Not only is the gameplay of Fortnite appealing to the mainstream, we believe Epic is using eSports to attract the widest possible audience. The company recently announced the Fortnite World Cup in 2019, a series of eSports tournaments with an unprecedented prize pool of \$100mn. For context, the total eSports prize pool in 2017 was \$113mn. The World Cup will feature tournaments that Epic is making accessible to all types of players, not just pros, in an effort to maximize interest in the game. Therefore, we see Fortnite as having a similar effect on video games that Moneymaker's victory had on poker: an inflection in audience growth that moves video games and eSports into the mainstream. As eSports audiences continue to grow, we believe monetization should follow.

**Exhibit 29: The “Moneymaker effect” caused an inflection in growth for poker**

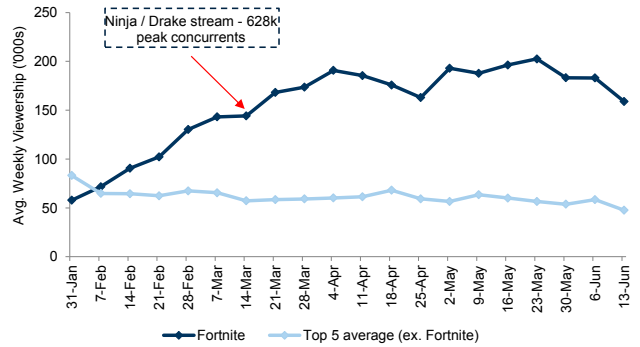
1st place prize money for the WSOP (1990 to 2017A)



Source: World Series of Poker

**Exhibit 30: The Ninja / Drake live-stream coincided with accelerating growth for Fortnite**

Average weekly Twitch viewership for Fortnite and top PC games

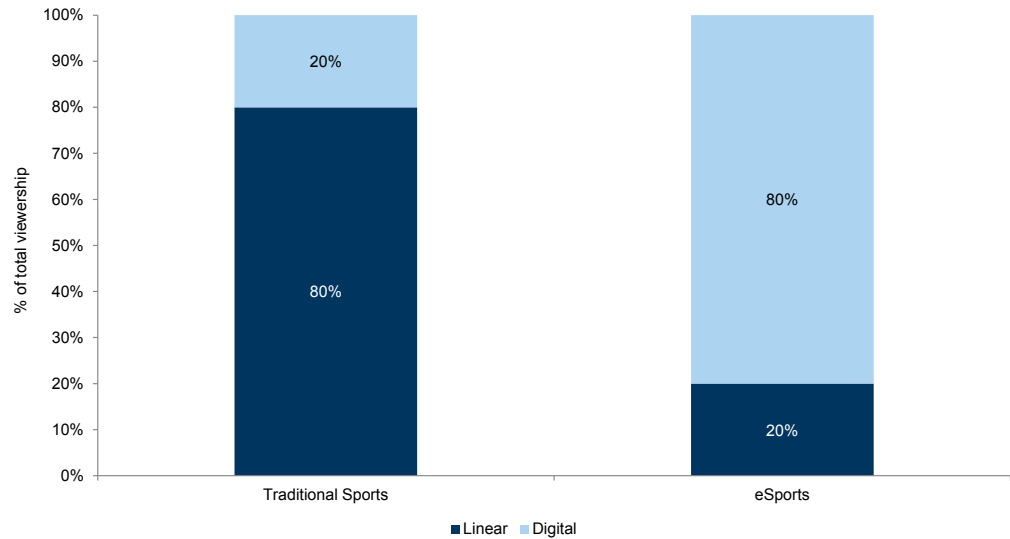


Note: The Top 5 Average includes League of Legends, Overwatch, PUBG, CS:GO, and Hearthstone

## A New Paradigm for Distribution

Unlike traditional sports, the vast majority of eSports viewership is online, the same medium where multiplayer game play takes place and through which the eSports audience consumes media content. According to [Nielsen](#), more than 80% of eSports fans watch online. For this user base, online media platforms like Twitch and YouTube in the West and Douyu and Huya in the East serve as the key distribution point for eSports content. Also, we believe these platforms elicit strong and uninterrupted user engagement through chat features that inhibit second screen distractions, as are common with TV viewership. For traditional sports viewership, on the other hand, viewership is 80% linear and just 20% digital, based on a Business Insider survey from 3Q17. We believe traditional sports audiences may want to consume more content digitally over time, but a business model shift away from linear-first to OTT-digital is complicated by outsized economics from TV rights fees that make up 40% of league revenue on average. Still, we believe eSports distribution can lay a blueprint for other leagues keen to pursue a distribution model that is over-the-top and global, and a viewing experience that is social, interactive, and highly-engaging.

**Exhibit 31: Only ~20% of viewership for traditional sports is digital, vs. ~80% for eSports**  
 Linear and Digital Viewership - Professional Sports vs. eSports



Source: Business Insider, Goldman Sachs Global Investment Research, Mediapost

In the coming years, we believe eSports content (particularly live) will continue to grow in value, not only due to its audience reach but also the engagement it commands, creating an opportunity for advertisers to target a captive and young demographic. As a result, we believe the media rights paid by online video platforms to video game IP owners will also grow in value as formalized leagues are created. We estimate that media rights, which are 14% of eSports revenue today, will reach 40% of total by 2022, similar to the current average of 37% for major western sports leagues today. See the section on “League Infrastructure Will Create Opportunities for Monetization” for more detail.

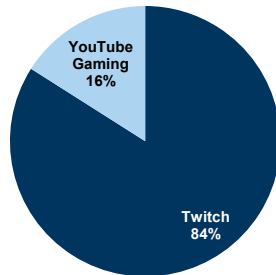
### The leading players for eSports distribution in the West

In 2014, Amazon purchased Twitch for roughly \$1bn, and since that time, Twitch has become the leading Western platform for live game streaming consumption, with an audience of over 100mn MAUs that reaches half of all millennial males in North America, according to Twitch Advertising. YouTube Gaming is another primary destination for eSports audiences, and according to Statista had roughly 1/3 the number of concurrent streamers as Twitch as of 3Q17. But when including library content, we estimate the YouTube Gaming audience is 300mn MAUs, 3x the size of Twitch. YouTube has reported a total audience of 1.5bn MAUs, and we then assume 20% of that audience watches gaming, based on a 2014 estimate that 15% of videos on YouTube are gaming-related, according to Tubular Labs. We assume that today the percentage of gaming-related content has increased from 2014 levels, with the growing popularity of eSports. Despite having a larger audience than Twitch, YouTube doesn’t have the same level of engagement, as its viewership tends to skew more towards library content than live. Twitch, on the other hand, has 84% market share of live-streamers in North America,

according to NewZoo. As a result, the platform captures 1,776mn hours / quarter, relative to 360mn hours / quarter for YouTube.

**Exhibit 32: Twitch captured 84% of engagement related to gaming in 1Q18**

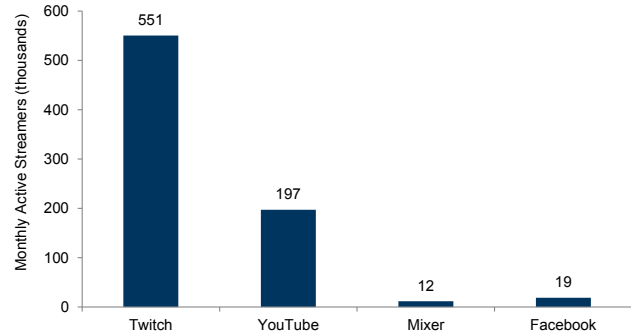
Twitch vs. YouTube gaming engagement - 1Q18



Source: NewZoo

**Exhibit 33: Twitch claimed >70% share of monthly active streamers in the U.S. in December**

Western-based streaming services by streamers

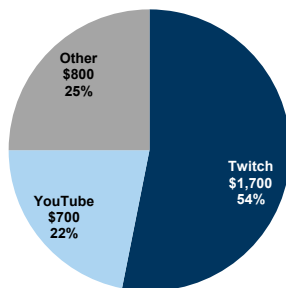


Source: Streamlabs

Due to higher levels of engagement, we believe Twitch also monetizes better than YouTube Gaming. According to SuperData, Twitch generates \$1.70bn in gross merchandise value (GMV), or the total value of all transactions that flow through the platform, relative to \$700mn for YouTube Gaming. The majority of GMV for Twitch (about 51%) comes from subscriptions and donations. After direct spending, 41% of GMV comes from advertising, while sponsorships contribute the remaining 8%. By way of comparison, YouTube generates the vast majority — about 69% — of its GMV from ads.

**Exhibit 34: Twitch has over 50% market share of gaming GMV for online video platforms**

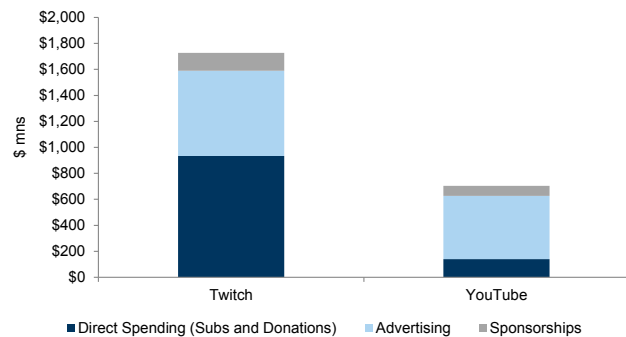
Gaming Video Content GMV market share by company (2017A); \$mns



Source: SuperData

**Exhibit 35: Twitch has demonstrated a superior ability to monetize its gaming audience**

Twitch vs. YouTube GMV monetization gap (2017A)



Source: Goldman Sachs Global Investment Research, SuperData

In Exhibit 36 below, we put together a model for Twitch that estimates both GMV and revenue. In 2017, there were 355bn total minutes viewed on Twitch, up 22% y/y, and because Twitch does not disclose revenue, we use growth in minutes viewed as a proxy for GMV growth. As a result, we estimate Twitch GMV grew by 22% y/y in 2017. The majority of GMV comes from tip-based subscription and streamer-controlled advertisement placements, both of which have a 50/50 subscription payment model (sometimes 60/40 or higher depending on popularity of the streamer). Therefore, we

estimate Twitch revenue was also up 22% y/y in 2017. It's worth noting, however, that in mid-2017, Twitch introduced the affiliate program, which caters to streamers with smaller audiences. For 2017, Twitch revealed that 223% more streamers are getting paid relative to last year, which could mean that revenue is growing even faster than the 22% growth we're modeling for 2017. For 2018, we model 27% growth, largely due to the success of Fortnite in conjunction with a ramp in Twitch's affiliate programs.

### Exhibit 36: We expect Twitch revenue will grow at an 18% 5-year CAGR from 2017A to 2022E

Twitch Revenue Model (2017A to 2022E)

\$ mns	2016A	2017A	2018E	2019E	2020E	2021E	2022E
<b>Gaming Video Content - gross</b>							
Direct Spending (subscriptions and donations)		\$933	\$1,213	\$1,516	\$1,820	\$2,093	\$2,365
y/y growth %			30%	25%	20%	15%	13%
Advertising		\$657	\$804	\$925	\$1,055	\$1,192	\$1,335
y/y growth %			23%	15%	14%	13%	12%
Sponsorships		\$138	\$173	\$207	\$249	\$299	\$358
y/y growth %			25%	20%	20%	20%	20%
<b>Gaming Video Content GMV on Twitch</b>	<b>\$1,416</b>	<b>\$1,728</b>	<b>\$2,190</b>	<b>\$2,649</b>	<b>\$3,123</b>	<b>\$3,583</b>	<b>\$4,058</b>
y/y growth %		22%	27%	21%	18%	15%	13%
<b>Assumed splits with partner / affiliate streamers</b>							
Direct Spending (subscriptions and donations)	50%	50%	50%	50%	50%	50%	50%
Advertising	50%	50%	50%	50%	50%	50%	50%
Sponsorships	50%	50%	50%	50%	50%	50%	50%
<b>Twitch revenue</b>							
Direct Spending (subscriptions and donations)		\$467	\$607	\$758	\$910	\$1,046	\$1,182
Advertising		\$328	\$402	\$463	\$527	\$596	\$667
Sponsorships		\$69	\$86	\$104	\$124	\$149	\$179
<b>Total Twitch revenue</b>	<b>\$708</b>	<b>\$864</b>	<b>\$1,095</b>	<b>\$1,324</b>	<b>\$1,561</b>	<b>\$1,791</b>	<b>\$2,029</b>
y/y growth %		22%	27%	21%	18%	15%	13%

Source: SuperData, Goldman Sachs Global Investment Research

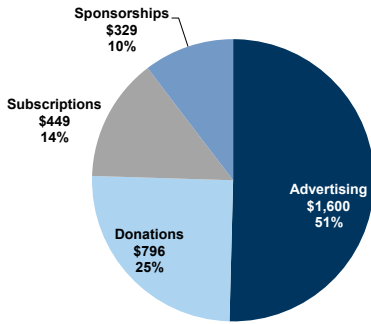
### How eSports distribution is monetized by leading OTT platforms

According to SuperData, the gaming video content market, or "online videos and live-streams related to all things gaming," generated \$3.2bn in gross revenue (before payouts to affiliates) in 2017. There are four main sources of monetization, including advertising, donations, online subscriptions, and sponsorship. Currently, advertising is the largest source of revenue at \$1.6bn, or ~50% of total, followed by donations, or "tipping," which generated nearly \$800mn in revenue in 2017, or 25% of total.

**The advertising opportunity.** Online video platforms with eSports content generated 51% of gross revenue from advertising, or \$1.6bn in 2017A, according to SuperData. Of this \$1.6bn, Twitch generated the most gross revenue from advertising at \$708mn, more than 1.5x the gross ad revenue generated by YouTube (gaming only), despite a much smaller audience. eSports advertising today allows streamers to monetize their activity, either by charging a flat fee, employing affiliate marketing where streamers earn commissions on product sales, or via partnership / revenue sharing programs on YouTube/Twitch ([link](#)). On Twitch, for example, pro streamers earn an average of \$250 in advertising revenue per month per 100 subscribers as of May 2016, according to CNBC ([link](#)). We believe that eSports audience growth will continue to drive growth in the advertising opportunity as well. And given our belief that eSports audiences are growing at a 5-year CAGR of 14% between 2017 and 2022, we see significant runway for the eSports advertising opportunity.

**Exhibit 37: Advertising represented 51% of overall Gaming Video Content gross revenue in 2017A**

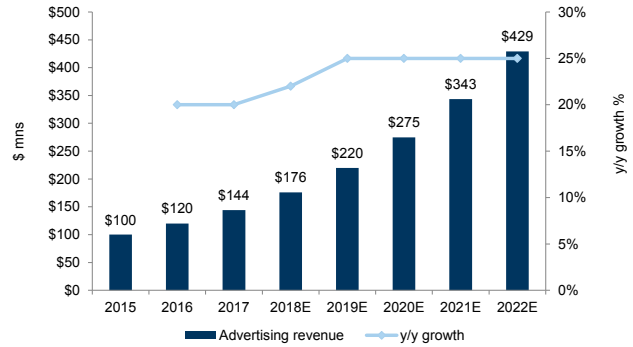
Gaming Video Content gross revenue breakdown by category - 2017A



Source: SuperData, Goldman Sachs Global Investment Research

**Exhibit 38: We expect eSports gross advertising revenue will grow at a 25% CAGR from 2018E to 2022E**

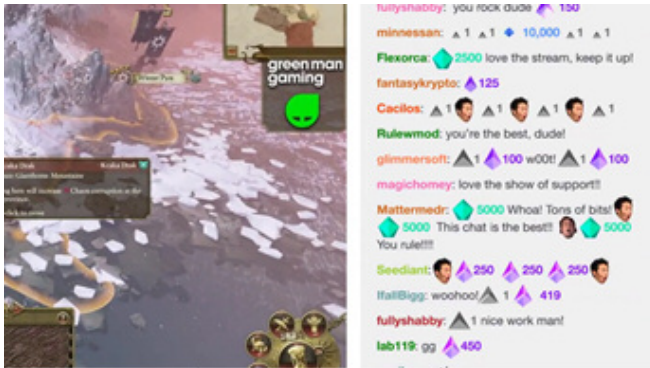
eSports gross advertising revenue growth forecast (2015A to 2022E)



Source: Goldman Sachs Global Investment Research, SuperData, NewZoo

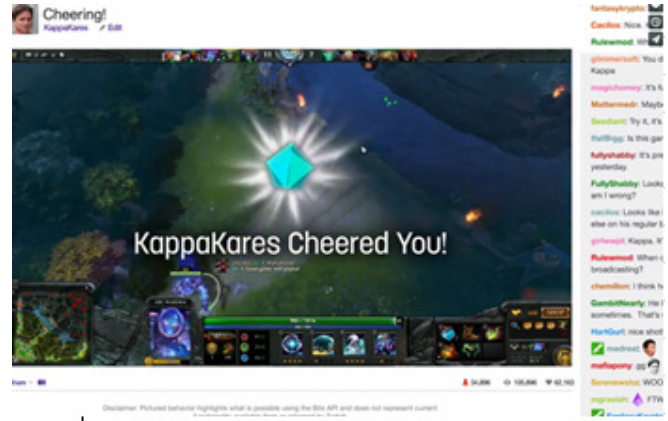
**The tipping opportunity.** In June 2016, Twitch added a “cheering” feature to its platform called Twitch Bits service. More specifically, the “cheering” feature allows a fan streaming gaming content to offer praise to a live streamer in the form of a virtual good (Exhibit 39 below). The streamer, in the midst of competition, will receive notification (Exhibit 40) that he/she has received a bit. Streamers then can utilize third-party tools to automatically thank people for their support.

**Exhibit 39: Cheering’s functionality is embedded in Twitch’s chat function...**



Source: Twitch

**Exhibit 40: ...and allows players to receive “cheers” in the midst of play**



Source: Twitch

The cost of bits ranges from \$1.40 for 100 to \$308 for 25,000. An individual can cheer any amount he or she chooses, and the emotes get larger and larger the more the individual spends (see the progression in Exhibit 41 below). According to Twitch CEO Emmett Shear: “If channel subscriptions are the equivalent to holding season tickets for your favorite sports team” then “cheering is like getting a crowd wave started during the game.” Thus far, user reception of this feature on Twitch has been largely positive, and, according to *Variety*, users sent more than 1 billion bits from June 2016 to April 2017.



**Exhibit 41: Twitch bit emotes**

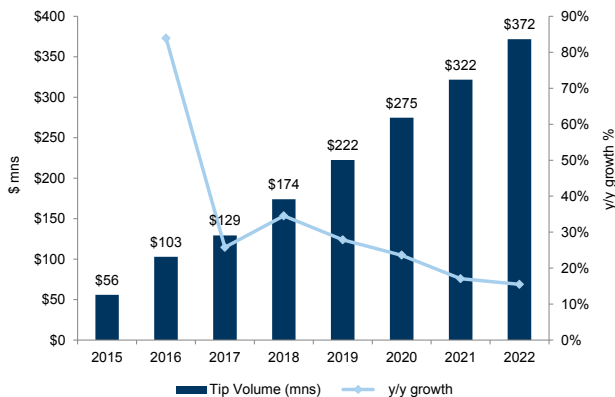


Source: Twitch

In the U.S., we estimate the total tipping market is roughly \$129mn, and as of 2017 was growing 26% y/y. In China, however, we believe the tipping market is far larger, and extends well beyond gaming to other forms of live-streaming. Based on the strength of user engagement with live-streaming — and for gaming in particular — we think tipping will continue to be one of the primary monetization mechanisms for live-streaming platforms like Twitch. According to data from Streamlabs, a service that allows Twitch streamers to collect tipping revenue on the platform, the annual average revenue per follower generated by live streamers on Twitch grew 93% y/y in 2016. We expect revenue per follower to grow at a more modest 8% 5-year CAGR from 2017 to 2022E, due to improving engagement. We expect followers on Twitch to grow in-line with our eSports audience 5-year CAGR estimate of 14%. The product of these estimates yield our forecast for the overall tipping market, which we think will grow at a 24% CAGR over the next 5 years to reach \$372mn by 2022E.

**Exhibit 42: We expect the tipping market in the U.S. will reach \$372mn in 2022E**

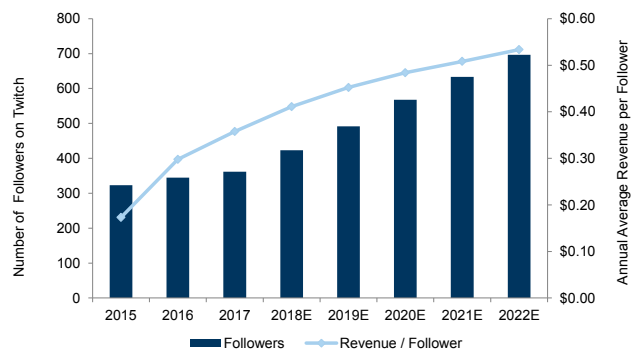
U.S. Annual tipping revenue (2015-2017A) and GS forecast (2018 to 2022E)



Source: Streamlabs, Goldman Sachs Global Investment Research

**Exhibit 43: We expect annual revenue per follower to rise due to improving engagement**

Annual Average Revenue per Follower and Followers on Twitch (2015 to 2022E)



Note: 2015 and 2016 data is from Streamlabs; 2017 data is GS

Source: Streamlabs, Goldman Sachs Global Investment Research

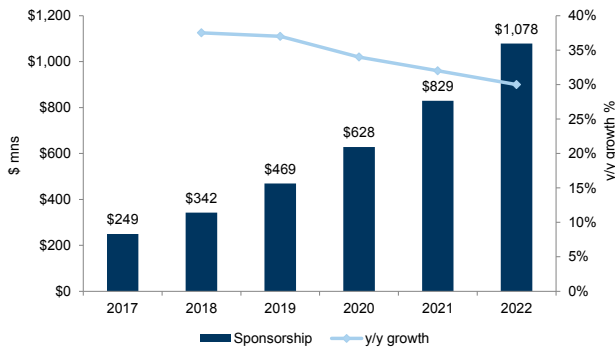
**The sponsorship opportunity.** In 2017, we estimate that 38% of eSports gross revenue (before payouts to affiliates) came from sponsorships, or nearly \$250mn. While historically eSports sponsors have been limited to closely related industries such as technology hardware, in the past several years we have seen more mainstream



sponsors such as insurance, beverage, and car companies enter the fray. As an example, the North American League of Legends League and the Overwatch League count Toyota, T-Mobile, Sour Patch Kids, Coca-Cola, American Express, and others as non-endemic sponsors. Importantly, we believe the presence of non-endemic sponsors in eSports only started to become prevalent after Riot and Blizzard created established eSports leagues. Nevertheless, the \$250mn we estimate in 2017 revenue pales in comparison to the NFL, for example, which earned \$1.25bn in sponsorship revenue in the 2016-2017 season according to IEG ([link](#)). But we believe that continued progress in the establishment of eSports structured leagues, reinforced by continued double-digit y/y audience growth, will drive sponsorship revenue growth to over \$1bn by 2022, at which point we expect the eSports audience will reach 275mn, comparable to what the NFL has today.

**Exhibit 44: We believe sponsorship revenue will grow to over \$1bn by 2022...**

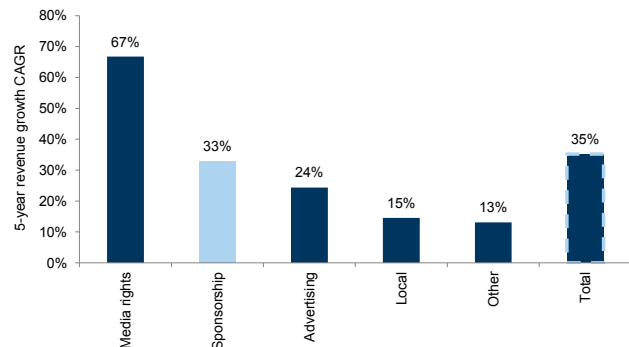
eSports sponsorship revenue and y/y revenue growth % (2017 to 2022E)



Source: Goldman Sachs Global Investment Research, New Zoo

**Exhibit 45: ...and will grow at the second fastest CAGR among eSports revenue streams**

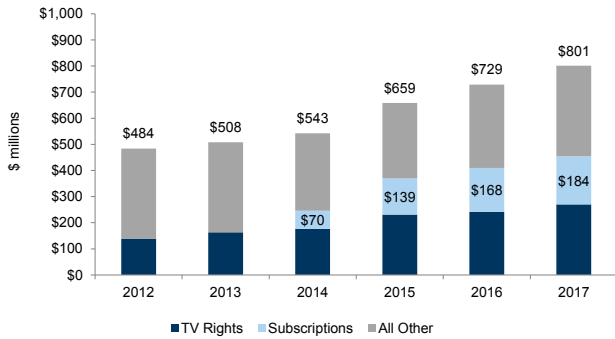
5-year eSports revenue stream growth CAGRs (2017 to 2022E)



Source: Goldman Sachs Global Investment Research, New Zoo, Superdata

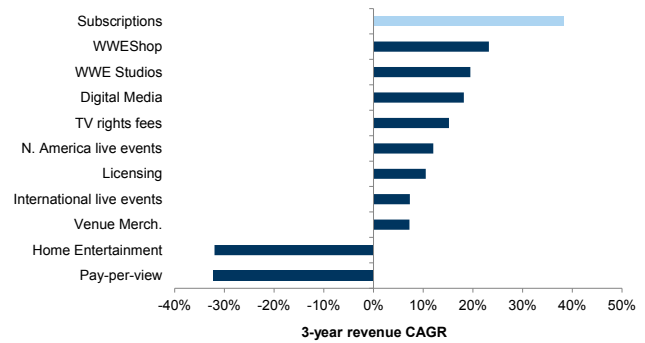
**The direct-to-consumer subscription opportunity.** Over time, we believe some eSports leagues may migrate to a freemium model, where tournaments are still live-streamed for free on online video platforms, but where viewers can pay for subscriptions that include premium content. The WWE has started to shift to a direct-to-consumer subscription model outside of the pay TV ecosystem, where fans can sign up and watch WWE content for \$9.99 / month. Since it was rolled out in 2015, subscriptions have been the fastest growing part of WWE’s business, and contributed 23% of league revenue in 2017. We believe WWE has blazed the trail for a new way of consuming sports content that is fully separated from the TV bundle, which we think insulates them from future cord-cutting risk while also giving them access to a younger demographic that may never sign up for pay TV. We estimate that by 2022 media rights will make up 40% of total eSports revenue, or \$1.2bn, though it’s possible that some portion of that is revenue stream could instead be part of a direct-to-consumer subscription.

**Exhibit 46: Subscriptions have risen steadily to 23% of total revenue for the WWE in 2017**  
 WWE revenue by type (2012A-2017A)



Source: Company data, Goldman Sachs Global Investment Research

**Exhibit 47: Subscriptions are the WWE's fastest source of revenue growth**  
 3-year revenue CAGR (16-19) for WWE revenue by type



Source: Company data, Goldman Sachs Global Investment Research

## Asia is Leading the Way for eSports Globally

### China - The Largest eSports market in the world

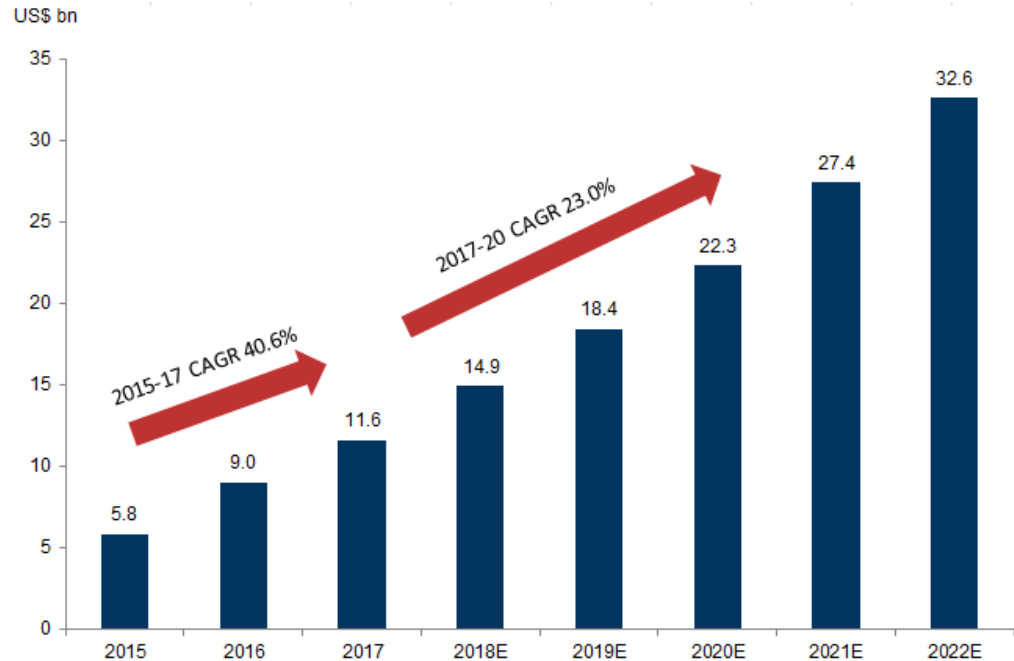
China's booming eSports market is built upon the largest gamer base in the world, with approximately 442 million gamers by the end of 2017 and a 57.2% penetration rate of China internet users, according to CNNIC. According to NewZoo, China by 2018 will contribute one third of global game industry's total revenue, and will remain the number one gaming market by revenues and by players. A robust user base has contributed to the rise of eSports in China. With mobile gaming popularity growing rapidly, more mobile eSports titles (e.g Honor of Kings) have emerged in China, driving a step-up of in eSport market size with a 2015 to 2017 CAGR of 40.6%.

China's online gaming and eSport sector has moved from a niche market into the mainstream due to the range of games and the engagement. As the gaming industry has matured, perceptions towards online gaming and eSports has gradually changed. In 2016, China's NDRC (National Development and Reform Commission) issued a policy to "encourage national and international eSport tournaments, on the premise of protection over IP and minors." The Ministry of Education has also recognized eSports as a major of study for higher education. Under this benign policy environment, more capital has flowed into the Chinese eSport ecosystem, yielding more professional leagues, tournament producers, content distributors and specialized stadiums. The positive investment thesis is further backed by local governments' support by way of infrastructure (e.g. providing real estate) and has resulted in multiple brick-and-mortar hubs across China and even an "eSport town."

Chinese professional eSports leagues have also gained recognition in the global arena: most recently, Chinese team RNG won the [2018 LoL MSI world championship](#), with 60mn unique viewers watching the final between RNG and a Korean team. Korea helped to create the eSports industry 16 years ago and it has since evolved into a national pastime - but China's eSports industry is still nascent. We expect further growth

of China's eSports industry driven by more tournament IPs, enhanced distribution channels (e.g. live-streaming platforms), infrastructure development and inbound capital across the eSports ecosystem. The industry in China is expected to grow at 23% CAGR during 2017-22E according to Frost & Sullivan.

**Exhibit 48: The China eSports market is expected to grow at a CAGR of 23% from 2017-22E**



Source: Frost & Sullivan

### Japan has specific issues for eSports

Japan has acquired a sizable presence in global gaming, as its console / mobile / PC gaming market is now worth ¥1.3tn. Japan's presence is even greater in console gaming, as supplier of two of the three big-name consoles. But while the global eSports market has grown to \$660mn (2017), Japan's eSports market has registered negligible growth. Japan is clearly lagging in establishing a presence in eSports, particularly when compared with its high profile in console and mobile gaming. In our view this is due to the existence of Japan-specific challenges, including legislative constraints (the Act against Unjustifiable Premiums and Misleading Representations puts a cap on cash prizes for eSports tournaments), and a lack of cohesion within the gaming industry (as evidenced by the plethora of eSports-related industry organizations that existed until recently). This year, though, the wind seems to be altering direction. We think 2018 potentially could become the year in which eSports really takes off in Japan.

### Spread of eSports stymied by cash prize limits imposed under Act against Unjustifiable Premiums and Misleading Representations

The Act against Unjustifiable Premiums and Misleading Representations has significantly slowed the spread of eSports in Japan. Companies organizing eSports tournaments and offering cash prizes to top finishers run the risk of breaching the above law; for this reason, cash prizes are limited to ¥100,000. We think this law is one factor

behind the sluggish spread of eSports in Japan, as compared with other countries where eSports tournaments can offer prize money in the hundreds of millions of yen. Domestic regulatory organizations are taking an increasingly proactive stance on establishing the framework necessary for an eSports market in Japan. For example, in March 2018, the Ministry of Internal Affairs and Communications (MIC) published a research report on the eSports industry, suggesting that the private sector needed to work together with authorities on finding a consensus interpretation of the Act against Unjustifiable Premiums and Misleading Representations. The report proposes that experts from the public and private sectors engage in debate over how the existing law is best interpreted—whether this means permitting tournaments with cash prizes, or limiting the number of participants—and even extends the discussion to potentially amending the Act.

### **Several eSports organizations merged into single entity, JeSU, in 2018**

The Japan eSports Union (JeSU) was established on February 1<sup>st</sup>, 2018, and began operating immediately. Previously, Japan had an abundance of eSports-related industry organizations, including the Computer Entertainment Supplier's Association (CESA), the Japan Online Game Association (JOGA), and the Japan eSports Association (JeSPA), as well as the eSports Promotion Organization, and Japan eSports Federation (JeSF). Now, though, these five organizations have combined to form Japan's first unified eSports body, partly because only such a united organization would be able to send teams to compete in international tournaments, and to apply for membership of the Japanese Olympic Committee (JOC). We think the establishment of JeSU marks the commencement of public-private cooperation on getting an eSports industry up and running, and believe 2018 could prove a critical juncture in the development of eSports in Japan.

### **Japanese game companies active in eSports space overseas**

In light of the aforementioned legislative hurdles domestically, Japanese game companies have been active in the eSports field internationally. Capcom, for example, has been holding Capcom Pro Tour tournaments around the world since 2014, inviting the top 32 finishers from each tournament to participate in the Capcom Cup at year's end. The Capcom Pro Tour features Street Fighter V as its only game, and as of May 2018 the company had held 92 eSports tournaments, handing out a total of US\$1.95mn in prize money. Capcom had delayed full-scale expansion of its eSports business in Japan because of the aforementioned legislative obstructions, but in a press release on February 13<sup>th</sup> the company announced plans to officially enter the eSports market in Japan, holding a high-level event called the Capcom Pro Tour Japan Premier Tournament at the 2018 Tokyo Game Show.

### **Plenty of potential in Japanese IP, especially in fighting games**

Among eSports genres, multiplayer online battle arena (MOBA) and first-person shooter (FPS) games are by far the most popular, but in Japan it seems that fighting games have particularly large potential. Exhibit 49 ranks the top games on Twitch based on number of hours watched (as of December 2017). Games at the top of the list include the

MOBA titles Dota 2 and League of Legends, along with FPS games such as Counter-Strike and Call of Duty. Both of the Japanese titles on this list—Street Fighter V from Capcom and Super Smash Bros. from Nintendo—fit into the fighting genre. In addition, at the JeSU-certified tournament Game Party Japan 2018, held in February 2018, professional licenses were issued for players that play six titles competitively, including Street Fighter V (Capcom) and Tekken 7 (Bandai Namco). Besides fighting games, there are prominent titles from a number of other genres including sports and puzzle games, among them Winning Eleven 2018 (Konami), selected by the Olympic Committee of Asia as one of the eSports titles for the “18th Asian Games Jakarta-Palembang 2018,” and Monster Strike (Mixi), which has racked up over 45mn cumulative global downloads.

**Exhibit 49: Japanese games such as Street Fighter ranked in the top 10 games on Twitch as measured by eSports hours watched in December 2017**

Top 10 games on Twitch by eSports hours watched - global - December 2017

Game Title	Total Hours (mns)	Esports Hours (mns)	Share Esports (%)
Dota 2	32.4	11.8	36%
CS: GO	18.8	6.8	36%
League of Legends	69.6	6.2	9%
Hearthstone	43.2	4.5	10%
CoD: WWII	6.9	1.6	24%
Street Fighter V	2.7	1.4	54%
StarCraft II	3.7	1	26%
Overwatch	17.9	0.7	4%
Rocket League	2.3	0.6	26%
Super Smash Bros.	0.9	0.6	68%

Source: NewZoo

## New Platforms for eSports

Today, PC is the primary platform for eSports worldwide. Currently, the top 10 eSports titles as measured by prize money are primarily or exclusively PC-based titles. This is especially true in China, the largest market for eSports, where PC contributed 56% of total games revenue in 2016, according to [NewZoo](#). However, we believe eSports will increasingly migrate to other platforms like console & mobile, as eSports continues to grow in Western markets where console gaming is more popular, and as mobile games continue to grow in popularity and attract the interest of a more mainstream audience.

**Exhibit 50: The top 5 all-time eSports are predominantly PC titles**

Top 10 eSports titles by prize money - lifetime to date

Top eSports titles awarding prize money - lifetime to date					
Rank	Title	Prize \$ awarded (\$ mns)	Players	Tournaments	Primary Platform
1	Dota 2	\$143.8	2,528	931	PC
2	Counter-Strike: Global Offensive	\$55.8	9,859	3,282	PC
3	League of Legends	\$53.5	5,513	2,074	PC
4	StarCraft II	\$26.7	1,752	4,846	PC
5	Heroes of the Storm	\$13.5	1,028	408	PC
6	Hearthstone: Heroes of Warcraft	\$12.2	1,745	711	PC/Mobile
7	Counter-Strike	\$11.0	2,633	589	PC
8	SMITE	\$8.4	472	88	PC
9	StarCraft: Brood War	\$7.6	623	508	PC
10	Overwatch	\$7.0	2,397	581	PC

Source: eSportsearnings.com

According to data from eSportsearnings.com, console games today represent about 7% of the prize pool for eSports; Call of Duty World League is the single largest contributor with \$17mn in prize money awarded in 2017. Over time, we think console will continue to grow in popularity as a platform for eSports events, particularly in Western markets. With sports titles, like Madden and NBA 2K, EA and TTWO have both partnered with the NFL and NBA, respectively, to create formal leagues that should not only create direct revenue opportunities for the leagues and IP owners, but also drive more players back into the games. Next, we think Activision will likely create a structured league for Call of Duty that more closely resembles what has already been created for Overwatch. We would expect to see all the same features — team sales, fixed regional team locations, player salaries, digital distribution deals — which we think will help to formalize Call of Duty as an eSport and continue to grow the popularity of console as an eSports platform.

**Exhibit 51: Console eSports prize money represents only 7% of the total to date**

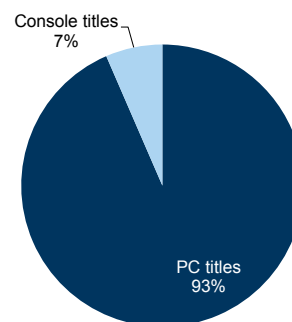
Console eSports prize money to date

Title	Prize money (\$ mns)
FIFA	\$4.6
Madden	\$1.4
CoD World League	\$17.4
All other console titles combined	\$4.5
<b>Total console eSports prize money</b>	<b>\$27.9</b>
Total eSports prize money	\$428.6
<b>Console eSports as % of total</b>	<b>7%</b>

Source: eSportsearnings.com, data compiled by Goldman Sachs Global Investment Research

**Exhibit 52: ...while PC titles represent the other 93%**

Console vs. non-console eSports prize money to date; \$mns



Source: eSportsearnings.com, data compiled by Goldman Sachs Global Investment Research

In Asia, mobile eSports have started to grow in popularity: Supercell’s Clash Royale was the most popular mobile-only game on YouTube and Twitch as of 4Q17, and has attracted over 22mn viewing hours across both platforms, according to NewZoo. For mobile

eSports, we think China may be a unique market, given the seamless integration of gaming and chat in Tencent's WeChat app, and the massive mobile gaming audience in the market. At peak, mobile game Honor of Kings had roughly 200mn users — more than the entire gaming population in the U.S. of 160mn.

For mobile eSports, we are seeing increased venture investment in the space. Skillz is a platform for mobile eSports that raised \$25mn of venture funding in December 2017. Skillz partners with mobile publishers like Zynga and Blizzard to host cash tournaments for games like *Candy Crush*. Also, Skillz provides a platform for casual contests among friends (or strangers), matching players through a ranking system of their scores. Interestingly, Skillz was named to the top spot in Inc's 5000 [list](#) for 2017, which tracks the fastest growing companies in the U.S., and Liberty Global (the largest international cable company by revenue) led the Series C round. According to Bloomberg, Skillz hosts more than 1 million tournaments per day and has doubled its monthly revenue to \$16mn in the last nine months ([link](#)).

## Q&A

### An interview with Andy Miller, co-founder of NRG eSports

*Andy Miller is co-founder of NRG eSports, an eSports holding company founded in 2015, as well as co-owner of the Sacramento Kings. Prior to NRG, Mr. Miller was the Vice President of Mobile Advertising at Apple. NRG has an investor list that includes Shaquille O'Neal, Alex Rodriguez, Michael Strahan, Tiesto, and many others. NRG owns the San Francisco Shock, one of 12 eSports franchises in Overwatch League (OWL), and also owns teams competing in other games such as Counter-Strike: Global Offensive, Rocket League, Hearthstone, and Fortnite.*

**CHRIS MERWIN:** Andy, you have a background in sports through your ownership stake in the Sacramento Kings. Can you talk about how you first came across eSports, and ultimately what attracted you to the space as an investor?

**ANDY MILLER:** Three or four years ago I started looking at eSports — I just had an investment with my business partner Jeff Glass, and I felt like I uncovered this giant audience, this unknown audience. But the reality was it was there the whole time, and we just weren't looking. When I started looking at the size of the audience, the demographic breakdown, and started to compare it to what we have with the Kings, it was insanely compelling with this Millennial base cohort, and incredibly passionate fans across all these different games, which are considered different sports. So it really got me enthused and I started to talk to one of my co-owners, Mark Mastrov, about it, and Shaquille O'Neal, both with the Kings. The three of us had done some businesses before, and said we should really just do this ourselves. We jumped in and bought a team, and two years later now we've announced our tenth team.

**CM:** The global eSports audience is already bigger than some major sports leagues, like the MLB and NHL, but over half of that audience is in Asia. How do you think about the audience opportunity for eSports over time, and geographically where are the biggest opportunities for growth?



**AM:** I think China is still just incredible, the opportunity there, especially when you start talking about local franchises like we have with Overwatch League. So just the potential expansion, the cities in China that have twenty, thirty million people are incredible. I think the US is still going to be the best opportunity for lots of reasons, because I think that at some point it will mirror the ad market and brand market — and those are challenging throughout Europe and Asia. But friends, and partners, and money have woken up to eSports and obviously the effect of gaming — and are super interested in getting involved in the North American scene.

**CM: Historically, eSports have been a bit like the Wild West — anyone can start a team and enter a tournament. But in the last couple of years it has started to change. You're an owner of the San Francisco Shock, one of the teams in the Overwatch League. Can you talk about what the Overwatch League has done for eSports, and how the league structure can help to drive audience and monetization over time?**

**AM:** Yeah, I think it's a template. I hope it is — it has changed everything really fast. eSports in the [beginning started with just] players, and now teams are run and owned by Robert Kraft or Comcast, so it has really professionalized super-fast. The Overwatch League is wonderful. It creates enterprise value based on the city franchises, it has predictability in its schedule, in its broadcasts, obviously there is revenue sharing and profit sharing amongst the league and teams, but most importantly it is incredibly professionally run. The contracts are standardized, and there is a full understanding with the players who are represented as to what their expectations are — it's very similar to the NBA. Blizzard has hired lots of [Team Marketing & Business Operations], and folks from TMBO at the NBA, so this is the way a league should be run. Now granted, it's a big swing, and they're putting a lot of money in there, and we all paid a lot of money for our franchises. But it is my hope that the major games follow suit.

**CM: In traditional sports, the largest revenue stream is media rights, and that's largely because of TV rights deals. But in eSports the vast majority of viewership takes place online. What do you think will be the largest revenue stream for eSports over time — will it be media rights, advertising, sponsorship, or something else?**

**AM:** I think it'll be media rights.

**CM: And why do you think that?**

**AM:** Well just because it's so global, and the numbers are so big. I look at the different opportunities we have with Overwatch League, where we sold the rights for the Twitch deal in North America, and there's other folks who are carrying this on terrestrial, and streaming in Korea and China, and I think we've just scratched the surface. Plus, streaming is where it's going to — away from cable and pre-determined channel lineups. So I think it's going to end up being really radical.

**CM: What do you think about the viewing experience of eSports today? Are there certain genres that are better suited for eSports than others? How can camera angles and replay help to enhance the viewing experience?**

**AM:** That's the big question. Something like Overwatch is hard to track. It's fun, it's kinetic, and if you know the game, you can just sit there and listen to the oohs and aahs with every little minor move. So if you play the game, you get it. But, how do you break out to more of the casual fan? I think Overwatch is



really starting to show the world that anybody can be interested in eSports and watching professional video gaming even if you don't play it. I never played football but I religiously watch football every Sunday. So I think that's a big opportunity, but there's definitely an education and a slowdown. Instant replays are important, top-down views are really important for the maps, just the meta, and the style of play as well. Right now the style of play in Overwatch is dive composition, which is just a bombardment of activity, and many team fights versus other games where it's slower, so I think that's really important. And then you see games that are just really easy to follow, like Rocket League. We're kicking a soccer ball with a car, and you watch it, and you get it within a few seconds — and you love it. Every publisher has a journey to get to the point where they don't break the kind of core tenets of their game, but obviously make it more viewable.

**CM: What do you think about driving local attendance for eSports events. Now that Overwatch League and League of Legends have regional teams, do you think we'll start to see more in-person attendance of league play, and can eSports end up like traditional pro sports leagues in that regard?**

**AM:** I hope so. The local aspect is really, really important. I think it's working, as far as our fan base [is concerned]. I look at it for the [San Francisco] Shock so far, I look at where our merch is being bought from and it's Northern California. When we host viewing parties up here they're all sold out, and pretty good numbers of people. The enthusiasm is there, but the question is, how many people can we get at an arena, a stadium, at a theater, and how often for Overwatch, or for different matches as well? There is definitely an appetite for gaming — it's super fun. Even our viewing parties where we're in a club, or bar, or theater, watching a match taking place in Los Angeles are rockets. It feels like game seven of the playoffs. So it's a great experience — people haven't had that ability to interact with their community. But I'm an Overwatch fan, and I love Overwatch. Maybe I have some friends who play, but there's a whole world out here of hundreds of thousands of people in the San Francisco area, and I want to hang out with them — we have a shared interest. And that's never really been possible before, unless they wanted to spend a lot of money and fly out to some major tournament somewhere in the world.

**CM: For traditional sports like football or basketball, the sports themselves, in theory, aren't as exposed to decay risk as video game IP. But what do you think about the lifecycle of video game content, and the sustainability of certain eSports, particularly those that you're invested in for the long term?**

**AM:** I'm not super worried about it. The games that are backed by big publishers that have a big player base I'm sure will last a long time. There is no real slowdown so far in Counter-Strike or Dota or League of Legends, and those have been around for ten, twenty-plus years. I'm sure Overwatch will be around for a long time — just the fact that you have big publishers putting a lot of time, effort, and money behind these titles, I think means that they'll last. It's no different from watching Star Wars movies — we're still watching Raiders of the Lost Ark movies. They just get rebooted and updated.

**CM: Today most of the eSports in the world are on PC, but do you think console and mobile eSports will become as popular in time, and which franchises will be best positioned?**

**AM:** I do think it will be big. I have a mobile background myself — NRG entered the founding franchise into the Clash Royale League. Mobile is more here in gaming than you think, because what are the biggest

games people are playing right now? Fortnite, PUBG? They're on mobile. Clash [of Clans]? Mobile. Hearthstone and games like that have been around for a while. So the question is — will they translate into good eSports? I think that's probably more a function of the game than the fact that it's on mobile, so we'll see. There will definitely be breakout games. I think the touch screens are capable now — there is a lack of latency, so I think the opportunity is definitely there.

**CM: Outside of owning a team, what do you think are the best areas for investment within eSports?**

**AM:** I think you're seeing eSports develop just like traditional sports. We have a need in our organization from these sports to have everything. There are vendors, there are professional sports teams. We need video reviewers, we need statistics analysis, we need visa help, we need training, nutrition, travel, streaming content creation, digital influence and marketing — it's everything that is around this ecosystem. Obviously the leagues are doing great — there are so many places to jump in.

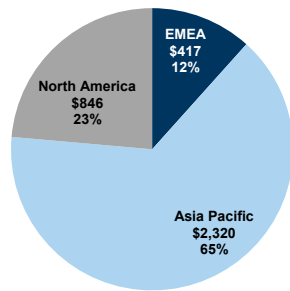
## The Venture Landscape



### Venture investments in eSports are accelerating

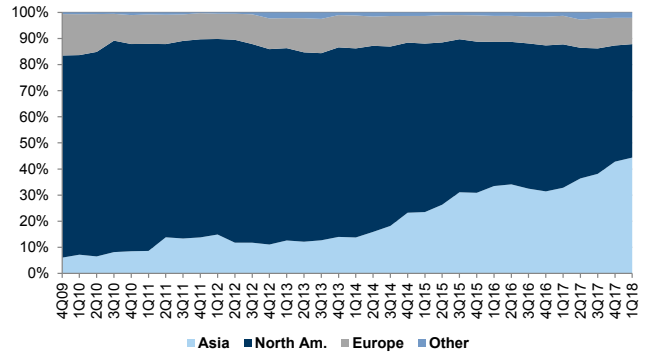
Since 2013, there has been \$3.3bn of venture capital investment in eSports-related start-ups. In 2018 YTD, we have already seen \$1.4bn of investment, a nearly 90% y/y increase from the total amount of funding in 2017. The uptick was largely driven by two outsized investments made by Tencent in Chinese online video platforms Douyu and Huya of \$630mn and \$461mn, respectively. We believe these investments in particular underscore two key trends: 1) the opportunity for live-streaming to monetize the growth in eSports in a way that few other eSports-related businesses can, and 2) the popularity of eSports in Asia in particular.

**Exhibit 53: APAC dominates the eSports venture landscape...**  
Total eSports venture funding by geography since 2013 (\$ bns)



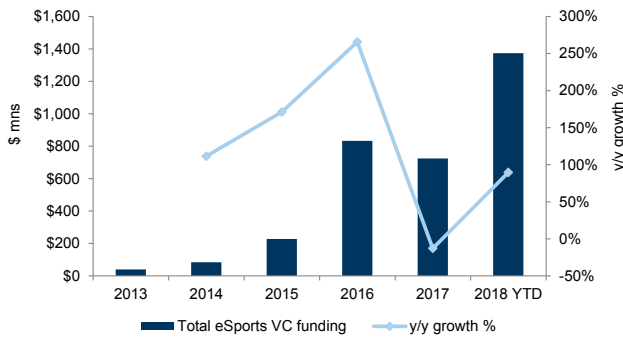
Source: CB Insights, data compiled by Goldman Sachs Global Investment Research

**Exhibit 54: ...consistent with APAC growing as a % of overall total global VC investment**  
Share of total global VC investment by region (\$ mns per deal)



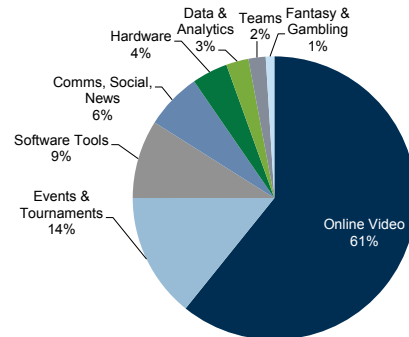
Source: CB Insights, data compiled by Goldman Sachs Global Investment Research

**Exhibit 55: eSports vc funding has grown 90% y/y in 2018 YTD...**  
Total eSports VC funding (2013 to 2018 YTD)



Source: CB Insights, Goldman Sachs Global Investment Research

**Exhibit 56: Online Video is the largest funding category to date**  
Total eSports VC funding by category (2013 to 2018 YTD)



Source: Goldman Sachs Global Investment Research, CB Insights

**Online Video has attracted most of the venture funding in eSports**

**Online Video.** This category includes companies focused on distributing / broadcasting eSports-related content, and is the largest area of investment within eSports as measured by venture capital funding rounds since 2013, representing 61% of total funding, or \$2bn. Notably, two Asia-based streaming platforms, Douyu and Huya, received a combined \$1.1bn in venture capital funding in early March 2018, largely from Tencent, while Huya later completed an IPO in May. In Western markets, Caffeine is an online video platform founded by several former Apple engineers aimed at taking share of the live-streaming market for eSports. The company raised \$46mn in Series A funding from Andreessen Horowitz and Greylock Partners in late January 2018.

**Events & Tournaments.** This category includes companies focused on managing eSports events and hosting eSports tournaments, and is the second largest category for funding to date, with 14% of total, or \$467mn. Super League Gaming hosts eSports competitions in movie theaters and online and has received \$34mn in total funding to date. Of note, aXiomatic eSports, which is backed by the Disney Accelerator and also owns League of Legend’s Team Liquid, is an investor in Super League Gaming. Skillz is

another venture-stage company in the vertical and is a mobile-focused eSports tournament organizer that partners with publishers like Zynga and Blizzard to host cash tournaments for games. The company raised \$25mn in December 2017 from Liberty Global and Telstra.

**Software tools.** This category includes companies focused on developing software tools for content creators and users. The category ranks third in terms of funding since 2013, with 9% of total, or \$294mn. Discord is an app designed specifically for gamers with voice, video, and text features, that facilitates communication during multi-player gameplay. The company raised \$50mn in Series F funding in April 2018 from Tencent, among others. Discord recently announced partnerships with a number of high-profile eSports teams as part of its Verified Servers program, which ensures that users know they are communicating with an official source ([link](#)), similar to the verified account feature on Facebook. Discord had 90mn registered users as of February, up from 45mn in June 2017. In the East, Wangjing Tech, a company that operates a website for internet cafe payments and eSports registry, raised \$31mn in February 2018.

**Communications, Social & News.** This category ranks fourth, with 6% of VC funding to date, \$212mn. Wikia, a collaborative platform similar to Wikipedia but focused partially on gaming via the site [FANDOM](#), raised \$106mn in February from Amazon and others, representing the largest raise in the category to date. Esports One, which raised \$3mn in January, operates a competitor site called esportspedia.

**Hardware.** Hardware has received 4% of funding, or \$134mn, since 2013. Razer, which received \$50mn in funding in May 2017, manufactures computer peripherals such as mice and keyboards, and some are designed specifically for eSports. Corsair Components, which also manufactures computer peripherals but with more of a focus on memory and power supplies, is the second largest hardware company to have received VC funding since 2013, raising \$75mn from Francisco Partners in 2013.

**Teams.** While the category we label "Teams" has only received 2% of funding since 2013, or \$64mn, the vast majority of financing for the category to date occurred in 2017, making it one of the fastest growing categories within the eSports venture landscape. For example, EnVyUs, which was originally founded in 2007 as a competitive Call of Duty team, recently raised \$35mn. Professional athletes and celebrities are increasingly investing alongside corporates in teams: Cloud9 eSports, which counts Joe Montana and the WWE as investors and has teams in a variety of leagues worldwide, raised \$25mn in September 2017. NRG eSports has an impressive list of investors - Alex Rodriguez, Jennifer Lopez, Shaquille O'Neal, Tiesto, Marshawn Lynch, and others - raised \$15mn, also in September of last year.

**Fantasy & Gambling.** This category has received 1% of funding since 2013, or \$32mn. Swedish-based G:loot, for example, raised \$12mn of financing in late 2017. The company facilitates cash-based gaming competitions on mobile, tablet, and PC. Similarly, Unikrn, which raised an undisclosed sum in December 2017, operates an eSports-focused gambling website.

For the whole eSports vertical, the top three venture-backed companies as measured by total funding are focused not only on the Asian market but are also backed by Asian-based investors. More specifically, Douyu and Huya are backed by Tencent and Hero Sports Management is backed by several Chinese government supported funds. In the U.S., the top eSports investors are Sequoia Capital, which has invested in Skillz and Streamlabs, among others; Greycroft Partners, which has invested in Gamer Sensei, Sliver.tv, and FanAI; and Techstars, which has invested in Innervate, Matcherino, Haste, and Mixer, among others.

### Exhibit 57: 3 of the top 5 Asia-based venture capital raises to date have been focused on live video distribution

#### Top 5 Asia-based venture capital raises

Company Name	Description	Total Funding to Date (\$ mns)	Most Recent Funding Date
Douyu	Live-streaming video distribution platform in Asia, similar to Twitch / YouTube Gaming; holds a leading positions in the Chinese eSports video streaming market	\$976	3/8/2018
Huya	Live-streaming video distribution platform in Asia, similar to Twitch / YouTube Gaming; holds a leading positions in the Chinese eSports video streaming market	\$535	3/8/2018
Hero Sports Management	eSports event organizer	\$337	9/29/2017
Chushou TV	Live-streaming video distribution platform in Asia, similar to Twitch / YouTube Gaming, but with more of a focus on mobile	\$154	12/27/2017
Wangjing Tech	Platform for internet cafe payments and eSports registry	\$55	2/10/2018

Source: CB Insights, data compiled by Goldman Sachs Global Investment Research

### Exhibit 58: Ownership groups focused on creating a portfolio of teams in addition to other eSports-related investments have emerged as key funding targets in the U.S. over the past ~year.

#### Top 5 U.S.-based venture capital raises

Company Name	Description	Total Funding to Date (\$ mns)	Most Recent Funding Date
Discord	Voice, video, and text chat app designed specifically for gamers	\$129	4/20/2018
Skillz	Mobile eSports platform that can be integrated into iOS and Android games as well as mobile eSports events organizer	\$54	12/13/2017
Wikia	Collaborative platform, similar to Wikipedia, focused on gaming; also known as Fandom; earns revenue through advertising and paid-for content	\$46	2/21/2018
Caffeine	Live-streaming video distribution platform in the U.S., similar to Twitch / YouTube Gaming; launched by a team of former Apple engineers and executives	\$46	1/31/2018
aXiomatic	eSports ownership group and investment platform. According to CBInsights, Axiomatic "acquires and manages businesses across the entire interactive-gaming ecosystem"	\$42	4/11/2018

Source: CB Insights

**Methodology.** Consistent with the updated methodology used in the Venture Capital Horizons reports ([link](#)), we define VC funding as Convertible note, seed, angel, Series A, Series B, Series C, Series D, Series E+, unattributed VC, corporate VC, "other VC", private equity, growth equity, and "other" funding to Venture-backed companies, as defined by CB-Insights. Unless otherwise indicated, data has been updated as of 6/5/18.

## Our Best Ideas for Investing in eSports

### Activision: Creating the building blocks for direct monetization

For video game publishers, we believe eSports can serve as a direct and indirect tailwind to the business. In the indirect model, eSports tournaments hosted by the publishers or third-parties can help to grow the audience for a game, deepen player

engagement, and ultimately drive in-game revenue at a very high incremental margin. But in the direct approach, a publisher can create a formal league for its IP to generate revenue streams from media rights, sponsorship, merchandising, etc. To date, we believe Activision has done the best job of combining these two strategies; indeed, they were a pioneer in the West as the first company to create an established eSports league that we believe has laid the framework for future leagues, both for its own IP and other publishers' IP as well. We rate shares of ATVI Buy with a \$82 price target.

**How to quantify the benefit of the eSports.** We estimate the Overwatch League will generate \$135mn in revenue in 2018, but little profit, due to one-time start up costs for the league. However, we believe the OWL will reach \$300mn in total revenue by 2023. After accounting for the profit split between owners and Activision, and taking into the account the benefit of team sales, we believe the Overwatch League will contribute \$201mn in EBIT to ATVI, or \$0.20 in EPS by 2023. We fully expect Activision will create an eSports league for Call of Duty similar to what it already has in place for Overwatch. We believe monetization for the Call of Duty League could scale more quickly than the OWL given established relationships with distribution partners and sponsors, and therefore expect that the Call of Duty League could contribute \$270mn in league revenue by 2023 and when factoring in profit sharing and the benefit of team sales could yield \$180mn of EBIT for Activision in 2023, or \$0.18 in EPS. All in, we estimate \$0.38 cents of value for ATVI, capitalized at 25x, and discounted back, yields \$6.50 / share in value today. We'd note that this estimate doesn't quantify any benefit from eSports to engagement and monetization for Overwatch and Call of Duty.

**What multiple does ATVI deserve?** ATVI is currently trading at 25x 2019 EPS, a one turn discount to the group average of 26x (ex-ZNGA) . However, our \$82 price target is based on 27x our 2019 EPS, a one turn premium to the group. We think the premium multiple is justified due Activision's un-matched platform diversification, industry leading EBIT margins of 35.9% in 2018E, and eSports exposure. We'd also note that two turns of multiple expansion on our 2019 EPS estimate of \$3.05 is equal to ~\$6.10 in value, close to the ~\$6.50 we think the direct profit streams from eSports are worth to ATVI today.

**Exhibit 59: We estimate eSports leagues can contribute \$0.38 to EPS for ATVI by 2023E**

Overwatch League and Call of Duty World League Model (2018E-2023E)

	2018E	2019E	2020E	2021E	2022E	2023E
Overwatch League Revenue	\$135	\$174	\$229	\$239	\$288	\$300
Call of Duty World League Revenue	\$0	\$35	\$114	\$168	\$231	\$270
<b>Total</b>	<b>\$135</b>	<b>\$209</b>	<b>\$343</b>	<b>\$407</b>	<b>\$519</b>	<b>\$569</b>
<i>y/y growth</i>		55%	64%	19%	28%	10%
<i>Owner-only Revenue (local revenue)</i>	\$0	\$0	\$14	\$14	\$15	\$22
<i>Activision-only Revenue (team sales)</i>	\$34	\$107	\$167	\$219	\$256	\$267
Margin (for shared revenue)	5%	20%	30%	40%	40%	40%
League operating expenses	\$128	\$167	\$240	\$244	\$312	\$341
<i>y/y growth</i>		300%	50%	33%	0%	0%
League profit	\$7	\$42	\$103	\$163	\$208	\$228
Split between owners / Activision	50%	50%	50%	50%	50%	50%
Activision share of operating profit (\$mns)	\$3	\$21	\$51	\$81	\$104	\$114
<b>Total Activision OI (including team sales)</b>	<b>\$38</b>	<b>\$128</b>	<b>\$219</b>	<b>\$300</b>	<b>\$360</b>	<b>\$381</b>
<i>y/y growth</i>		240%	71%	37%	20%	6%
Shares outstanding	774	780	784	789	794	799
<b>EPS Impact</b>	<b>\$0.04</b>	<b>\$0.13</b>	<b>\$0.22</b>	<b>\$0.30</b>	<b>\$0.36</b>	<b>\$0.38</b>

Source: Company data, Goldman Sachs Global Investment Research

**Rating and Key Risks.** We are Buy rated on ATVI shares with a 12-month price target of \$82, based on 27x 2019E EPS of \$3.05. Key risks relate to competition, particularly from Fortnite, a disappointment in Call of Duty sales, or a slower-than-expected ramp in King advertising or eSports revenue.

### Electronic Arts: Maximizing the eSports audience for in-game monetization

In addition to building a formal eSports league with direct monetization, we believe eSports can also benefit publishers in a different way - audience growth, increased engagement, and monetization. While we think Activision is best positioned to benefit from direct monetization, EA may be best positioned to benefit from indirect monetization. EA's eSports strategy has been much more focused on using competitions as a marketing tool for the games, which we believe has been very effective, as evidenced by the accelerating growth for FIFA Ultimate Team, especially in the face of competitive pressures from Fortnite. We rate shares of EA Buy with a \$158 price target.

**The indirect benefits of eSports are perhaps most meaningful for EA.** In June 2017, EA launched an eSports mode for FIFA 18 called FIFA Ultimate Team Champions ([link](#)), which helped to drive deeper engagement with Ultimate Team. Due in part to the success of this mode, live service revenue growth in the F3Q18 accelerated to +39% y/y, up from +22% in the F2Q and 15% in FY17. The quarterly live service growth - an absolute y/y increase of \$221mn - was the fastest for EA in 3 years. Ultimate Team was the most important driver of the acceleration in growth, which in turn benefited from eSports.

**We could see more direct monetization in time.** EA has already partnered with the NFL to create the Madden NFL Ultimate League, an official eSports league that runs between the end of the NFL season up to the NFL draft. The league has a linear



distribution deal in place with Disney, as well as a number of digital partners including Twitch and YouTube. But so far, EA hasn't created a formal eSports league for FIFA, a franchise that we believe generates close to \$2.5bn in annual revenue for EA. Unlike ATVI, which splits league profits with team owners, we believe EA would have to further split any league profits with FIFA. But even if EA's cut of league economics is lower than other publishers that fully own IP, we believe FIFA teams sales could fetch a premium valuation, given the evergreen nature of sports franchises, which we believe are less subject to decay risk than other types of IP.

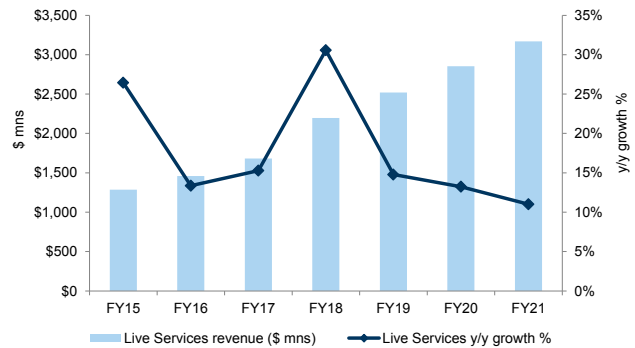
**EA doesn't get much credit for eSports today.** EA shares are currently trading at 24x CY19 EPS, two turns below the group average (ex-ZNGA). However, we don't believe EA gets full credit for the potential of eSports to help sustain double-digit live service revenue growth, or the potential to create a formal league for its sports properties, like FIFA down the road. Furthermore, we believe EA should get credit in its multiple for its push into subscription and streaming, initiatives that we believe can create a more predictable financial model and grow the addressable market. Our \$158 price target is based on 27x our CY19 EPS of \$5.85, a one turn premium to the group.

**Exhibit 60: EA's Live Services revenue grew 39% y/y in F3Q18...**  
EA Live Services revenue y/y growth % (F1Q17A to F4Q18A)



Source: Company data, Goldman Sachs Global Investment Research

**Exhibit 61: ...and we think the benefits of eSports can help sustain Live Services growth in the future**  
EA Live Services revenue y/y growth % (F15A to F21E)



Source: Goldman Sachs Global Investment Research

**Rating and Key Risks.** We are Buy-rated on EA shares with a 12-month price target of \$158, based on 27x CY19 EPS of \$5.85. Key risks: (-) EA is heavily dependent on its annual sports titles to drive year-to-year top-line growth, both from unit sales and Ultimate Team. If any of these titles starts to decay, FIFA in particular, we believe it could be difficult for EA to grow top line. EA is also susceptible to competitive threats in crowded release windows, like the Holiday Season. Further, gamer backlash against microtransactions could make it more difficult for EA to grow its live services revenue.

**Amazon: Uniquely positioned for eSports ecosystem growth**

When Amazon bought Twitch for \$1bn in 2014, its ambitions weren't entirely clear. Today, although little has been said by management to provide more insight, Twitch represents one of the most compelling assets in the world of eSports. With 550k+ monthly active streamers in the US alone, Twitch claims more than 70% share of monthly active streamers. While the financial impact today is relatively small (GSe \$864mn in 2017

revenue), extending its customer reach and brand into a category that is truly global presents multiple, diverse growth opportunities for the platform.

**Adding energy to the Prime flywheel.** Direct spending, or subscriptions and donations, represents the most meaningful revenue stream for Twitch on a standalone basis. Prior to the announcement of Twitch Prime in September 2016, viewers historically subscribed to individual channels and/or paid for Twitch Turbo, an ad-free experience across Twitch. With Twitch Prime, Amazon effectively made Twitch Turbo an Amazon Prime subscription benefit similar to Prime Video along with adding key benefits such as pre-order discounts and release-date delivery to integrate its retail business.

With Twitch Prime, Amazon has found another way to add value to a Prime membership and uniquely position the offering for the global gaming community. When Twitch Prime was initially launched, a monthly Amazon Prime membership was \$10.99 vs. \$8.99 for Twitch Turbo membership and Prime included 1 free channel subscription per month (\$4.99 value), incentivizing Turbo members to 'upgrade' to Amazon Prime. Ultimately, Twitch Prime provides Amazon with another means to inject more volume into its Prime flywheel, targeting a primarily young, tech-savvy, and international demographic.

**Advertising synergies.** Advertising revenue collected by Twitch reached almost \$330mn in 2017, according to our estimates. While information on its ad business is limited, the case for advertisers to be on Twitch is readily apparent: a highly engaged, young, online audience. Further, with its Prime overlap, Twitch creates the opportunity for advertisers to reach Prime members beyond Amazon.com. While we estimate Twitch's advertising business is growing slower than Amazon's multi-billion dollar ad business (ad revenue growth outpaced 'Other' +72% ex-accounting change in 1Q), we see potential for upside to Twitch ad growth as the platforms continue to collaborate.

**AWS seeing traction in gaming.** AWS currently offers two products under its Game Tech flag: Amazon GameLift and Amazon Lumberyard. Lumberyard is a free game engine integrated with Twitch and AWS, while GameLift, a dedicated game server hosting and matchmaking solution, has seen meaningful adoption from publishers such as **Ubisoft**, **Bethesda**, and **Epic**. Ubisoft and Bethesda each leverage Amazon GameLift for its flexible, cloud-based game hosting infrastructure. Epic also runs Fortnite's dedicated game servers primarily on thousands of AWS instances (GameLift allows for cross-platform play). With the ability to scale globally, Amazon GameLift provides low-latency experiences and brings the cost benefits of cloud computing to game developers. With the level of growth expected in eSports globally we anticipate the demand for reliable, low-latency, inexpensive game server hosting to increase as well.

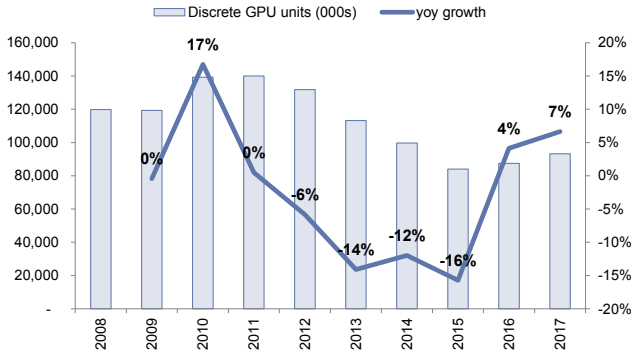
We are Buy-rated (on the CL) on AMZN shares. Our \$2,000 price target (12-month) is based on SOTP, implying 28x 2019E EV/EBITDA. Key risks include (-) Competition, margin pressures from investment, and valuation.

## **Nvidia: Leveraging scale and market position to capitalize on growth in the PC gaming market**

**PC gaming has driven a resurgence in the GPU market.** Following 4 consecutive years of unit declines in the Graphics Processing Unit (GPU) market, units grew 4%/7%

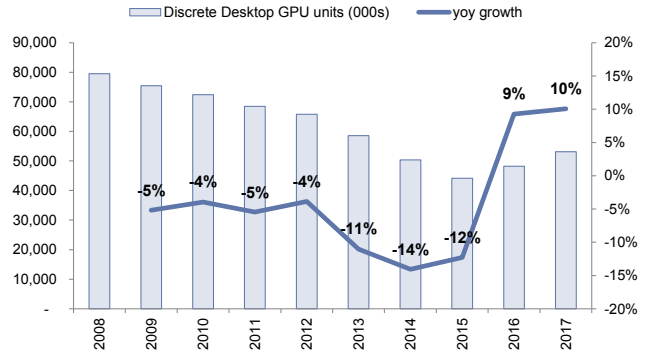
in 2016/2017 (Exhibit 62), respectively, benefitting from growing popularity of eSports, which has driven an increase in the PC gaming user base, in our view. This dynamic has been even more pronounced in the desktop GPU market, which had been in secular decline from 2008-2015 before inflecting in 2016 (Exhibit 63), and has since benefitted from rising GPU attach rates (Exhibit 64) as a larger % of desktop PCs are purchased for gaming purposes.

**Exhibit 62: Total GPU units returned to growth in 2016...**  
Discrete GPU units shipments



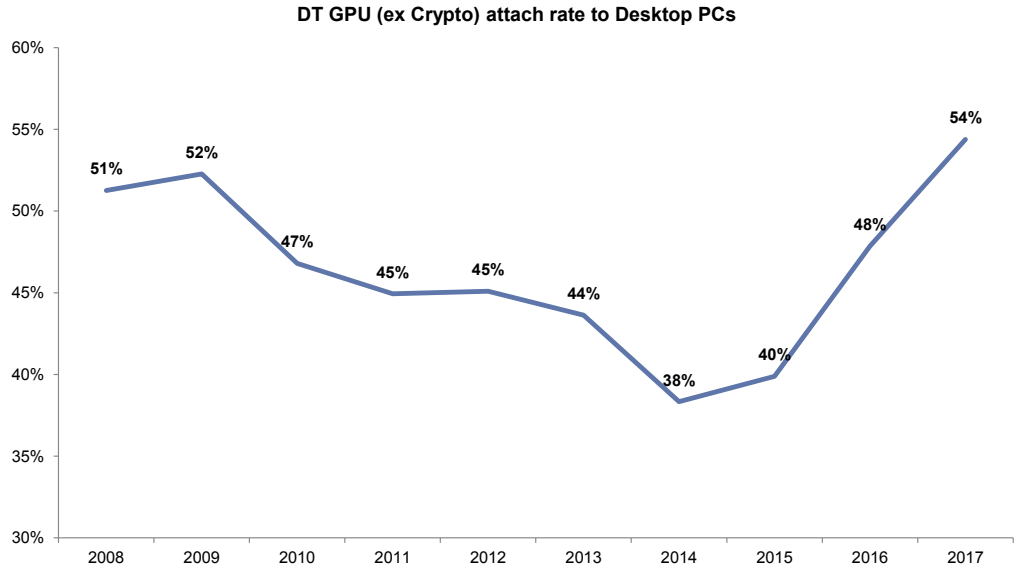
Source: Mercury Research

**Exhibit 63: ...driven by desktop GPU shipments**  
Discrete Desktop GPU unit shipments



Source: Mercury Research

**Exhibit 64: Desktop attach rates have increased as gaming has become more popular**  
Desktop GPU attach rate

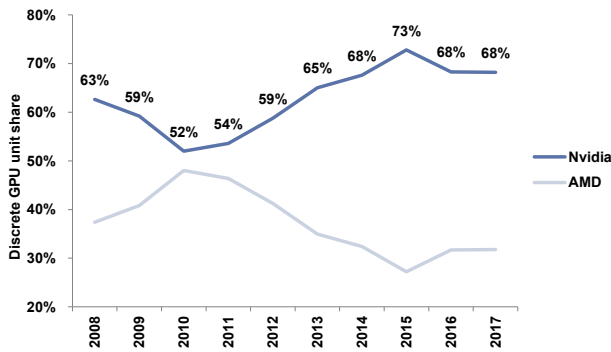


Source: Mercury Research, IDC

**We view Nvidia as uniquely positioned to capture growth in the PC gaming user base. Specifically, we expect the company to continue to leverage its scale and market position in order to capitalize on a growing gamer population and see significant upside to our current estimates. Below we highlight 3 key reasons why we expect the company to disproportionately benefit from continued growth in eSports.**

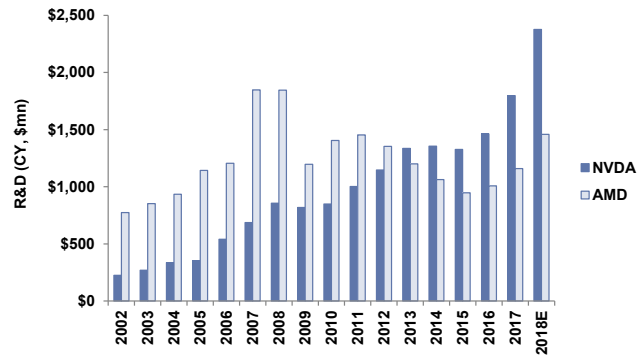
**Leading market share position.** Nvidia is the market share leader in discrete GPUs, which are used to render the images in video games. Nvidia addresses the eSports market through its GeForce line of GPUs, which are sold direct to gamers as well as through OEMs and retail channels. Nvidia is the market share leader in both the desktop GPU market, where it has 71% unit share and the notebook GPU market, where it has 65% share and Gaming GPUs accounted for 46% of Nvidia’s 2017 revenue. The discrete GPU market is essentially a duopoly with AMD taking the remaining share. We believe that Nvidia’s ability to maintain share has been driven by 1) consistent roadmap execution, 2) brand strength, and 3) its close relationship with the game developer community. On the latter point, note Nvidia’s GameWorks program provides rendering software libraries and support to game developers, with the strategy focused on increasing developer dependence on Nvidia’s software, which should produce games that perform better on Nvidia’s hardware, in our view. Going forward, we expect Nvidia to expand upon its share position, largely as a result of new product introductions (note its current Pascal generation of products was launched in 2016), which we expect to be released in the late-2018/early-2019 timeframe.

**Exhibit 65: Nvidia is the market share leader in GPUs**  
Discrete GPU unit share



Source: Mercury Research

**Exhibit 66: Nvidia has significantly larger R&D scale relative to its closest competitor**  
R&D (\$mn)



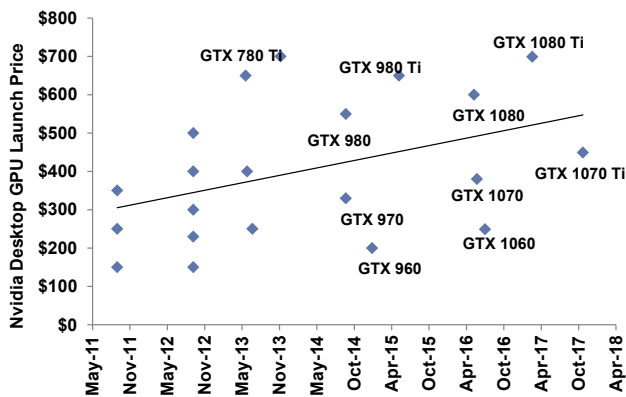
Source: Company data, Goldman Sachs Global Investment Research

**Scale.** Relative to its closest competitor, Nvidia has significantly higher R&D scale (Exhibit 66), particularly when accounting for the fact that Nvidia primarily invests in its GPU platform while AMD invests across a number of products including CPUs for multiple markets, GPUs, and console processors. Nvidia’s investment strategy is to leverage its GPU architecture across its multiple business lines, which include Datacenter/artificial intelligence (which is increasingly becoming a feature used in video games), professional graphics (i.e. game design and special effects), and automotive/autonomous vehicles. We view this strategy as one of the key factors that has enabled Nvidia to maintain its dominant position in the market.

**Pricing power.** As Exhibit 67 shows, Nvidia has been able to drive ASP expansion across multiple generations of GPU offerings. Note this trend is in stark contrast to Nvidia’s closest GPU competitor, AMD (Exhibit 68). We believe this dynamic highlights 1) the strength of Nvidia’s product offerings, 2) the efficacy of its R&D spend, and 3) its ability to leverage its dominant position in the market. We expect this trend to continue

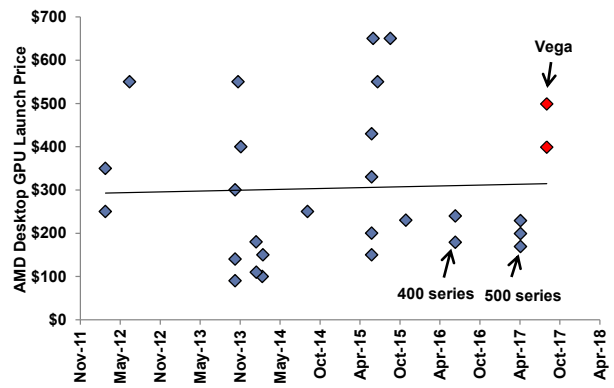
for the foreseeable future, driven primarily by the introduction of Volta-based products, outlined above.

**Exhibit 67: Nvidia has consistently expanded ASPs generation to generation...**



Source: Company data, Anandtech

**Exhibit 68: ...while AMD has had less success**



Source: Company data, Anandtech

**Quantifying the opportunity for Nvidia.** We see eSports as a significant driver of growth for Nvidia’s Gaming GPU business through both the expansion of the overall gaming (and therefore GPU) user base as well as the opportunity for sell-up (i.e. ASP expansion). Below we present a scenario analysis that illustrates the potential EPS upside for Nvidia based on expansion of the eSports audience and the assumption that as the eSports audience grows new viewers will also purchase GPUs given their interest in PC gaming and desire to participate in the sport.

We acknowledge that a range of outcomes exists beyond this analysis. Bottom line, we find that there could be 4%-30% upside to our CY20 Nvidia EPS (including ESO) estimates. We continue to view Nvidia as one of the few companies in our coverage with idiosyncratic growth drivers and would note that in addition its exposure to the Gaming market, Nvidia also has exposure to AI/machine learning (Datacenter was 20% of 2017 revenue), Consoles (Nintendo Switch was 9% of 2017 revenue), and Automotive (6% of 2017 revenue, though we expect this to grow with the adoption of autonomous vehicles).

The scenario analysis assumes the following:

- 22mn incremental eSports viewers from 2019-2020, note we start with 31mn incremental viewers (consistent with this report) then back out 9mn units which represents the incremental growth we already embed in our estimates,
- 40%-80% of all new viewers purchase a GPU for PC gaming (note this range embeds the assumption that not all new gamers will be PC gamers),
- GPU ASP of \$100-\$350, consistent with the range of GPU ASPs embedded in our current Nvidia estimates,
- 71% unit share for Nvidia, consistent with our current assumptions,
- Gross margin on GPU sales of 62%, consistent with our current Nvidia estimates,
- No incremental opex,

- All other assumptions (i.e. tax rate, share count) consistent with our current estimates.

**Exhibit 69: We see 4%-30% upside to our CY20 EPS estimate**

		2020 incremental revenue - total market				
\$mn	GPU ASP	% of new viewers purchasing GPU				
		40%	50%	60%	70%	80%
	\$100	875	1,093	1,312	1,530	1,749
	\$150	1,312	1,640	1,968	2,296	2,624
	\$200	1,749	2,186	2,624	3,061	3,498
	\$250	2,186	2,733	3,279	3,826	4,373
	\$300	2,624	3,279	3,935	4,591	5,247
	\$350	3,061	3,826	4,591	5,356	6,122

		NVDA - Potential CY20 EPS (incl ESO) upside				
GPU ASP		% of new viewers purchasing GPU				
		40%	50%	60%	70%	80%
	\$100	4%	5%	6%	7%	8%
	\$150	6%	8%	10%	11%	13%
	\$200	8%	11%	13%	15%	17%
	\$250	11%	13%	16%	19%	21%
	\$300	13%	16%	19%	22%	25%
	\$350	15%	19%	22%	26%	30%

Source: Goldman Sachs Global Investment Research

**Rating and Key Risks.** Our unchanged 12-month price target of \$310 is based on 33x FY20 EPS of \$9.39. Key risks to our constructive view include, volatility in Ethereum pricing (and therefore mining GPU sales), increased competition particularly in Datacenter, and execution on new products.

### Sony: Offering hit-agnostic investment opportunity in eSports

When it comes to stock selection based on involvement in eSports, we think Sony's strength lies in its relatively low reliance on hit titles, as we believe that as long as consoles remain the foremost gaming platform, Sony should see a profit contribution regardless of which titles are the most played. We reiterate our Buy rating on Sony (on the Conviction List), with a 12-month target price of ¥7,500 based on a SOTP. Of all Sony's businesses, we think the game & network services segment will be the fastest-growing; we see segment operating profits rising from ¥177.5bn in FY3/18 to ¥381.2bn in FY3/21, accounting for 37% of company profits. Risks include unpopular in-house game titles and delays in a turnaround of the movie business.

**Four key roles for Sony in relation to eSports.** We believe Sony has four key roles to play in eSports and video gaming. First, Sony is the provider of the world's leading console game platform. Second, the weighting of downloaded PlayStation games is rising, and this has made Sony the leading retailer, with a 35% share of software sales. Third, Sony is also a publisher, with a 15% share in PlayStation games. Fourth, Sony's business portfolio also includes TV program production, cable TV channels such as Game Show Network, and distribution platforms such as PS Vue. While Sony does not currently own any video media or channels devoted to video games, we think it certainly has the necessary building blocks.

In our view, these four roles present Sony with three business opportunities.

**Business opportunity in growing revenues from online sales.** All PlayStation online sales must go through Sony. PlayStation games account for US\$25.0bn of the US\$54.3bn console game market, and in 2017, 32% of PlayStation games were downloaded, with Sony booking roughly US\$7.0bn in network sales (we estimate that download fees alone generated sales of US\$2.1bn). The weighting of downloaded games is increasing year by year, and we see significant benefits for Sony's network business from the increasing popularity of eSports, which we think will be accompanied by growth in the gaming population, in take-up of free-to-start games, and in in-game purchases. We think this presents a significant business opportunity for Sony, and we expect network sales to more than double from US\$7.0bn in FY3/18 to US\$14.6bn in FY3/21, with download fees alone generating sales of US\$4.4bn.

**Business opportunity in role as media platform.** PlayStation is the world's leading console game platform, and even surpasses the PC as a platform appealing to core gamers. At its IR Day in May 2018, Sony revealed that PlayStation Network had roughly 80mn monthly active users (MAU) and 800mn hours of game play per week as of end-2017. This compares quite favorably with figures released in December 2017 by Netflix, which indicated that its global users watched 140mn hours of content per day, or 980mn hours per week. If it could succeed in switching at least some of this viewing time over to media streaming eSports, as the preferred platform for core gamers we think Sony could quite easily transform itself into the leading medium for eSports. In terms of media value, it is not entirely fair to directly compare PlayStation playing hours with YouTube and Netflix. That said, we believe there remain plenty of ways to make effective use of PlayStation as a media platform. For the very reason that PlayStation generates heavy network traffic and viewing hours, we see substantial opportunities for the media business in, for example, incorporating eSports media in the menu that is automatically displayed when PlayStation is first switched on, and in running content and advertising while PlayStation is loading. We think Sony could potentially generate sales of US\$250mn purely by capturing advertising demand equivalent to 10% of sales by software makers operating on the PlayStation platform. Sony also has amassed considerable experience in channel curation at its movie business, and by exercising group synergies we think it is better placed than other game companies or platform operators to start up new businesses.

**Business opportunity as a publisher.** The third business opportunity poses the toughest challenge for Sony, in our view. As a software maker, Sony needs in-house titles to account for a certain share of games on its PlayStation platform (its share as a publisher is around 15%). Mainstay in-house titles published by Sony to date include Gran Turismo, Uncharted, The Last of Us, and God of War. Excluding Gran Turismo, most titles have a strong story factor, and Sony has struggled as a publisher to turn these games into series titles. That said, Sony has identified the development of in-house titles as a key focus in its medium-term business plan, and we expect this situation to change moving forward.



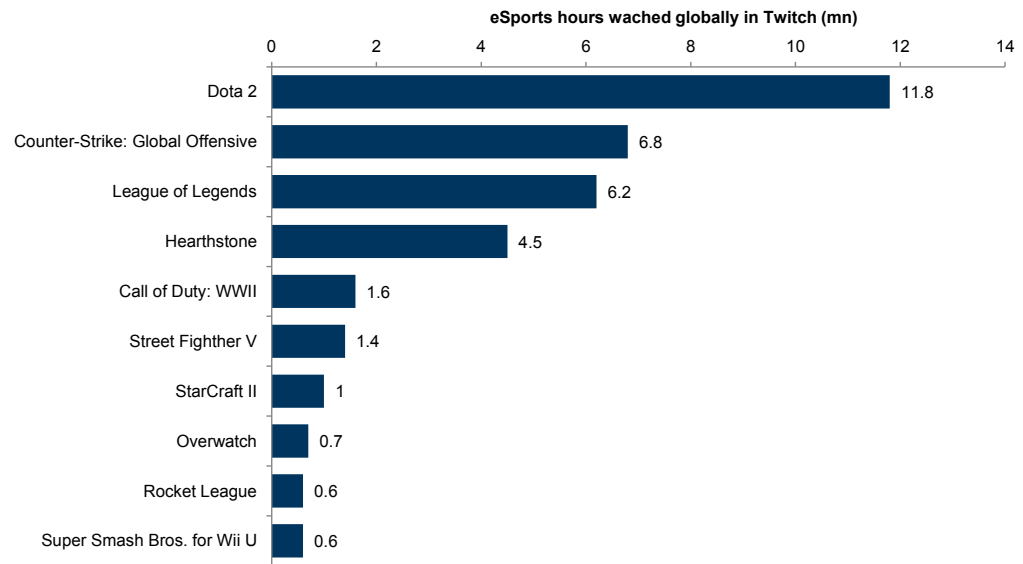
## Capcom: Street Fighter a classic eSports franchise

Capcom was established in Osaka in 1983 as a specialist game development and sales company and is now one of Japan's leading game companies. Capcom reported FY3/18 operating profits of ¥16bn, with the console, mobile, and PC game businesses generating operating profits of more than ¥19bn. Console games are currently the centerpiece of Capcom's mainstay business. Capcom has a long history and many big-name game franchises, including Resident Evil (cumulative sales of 83mn units), Monster Hunter (48mn units), and Street Fighter (40mn units), and we think the company has potential to expand these franchises in the eSports market. We maintain our 12-month price target of ¥3,100 based on FY3/21E EV/NOPAT of 14.7x. Risks include disappointing showings for major console titles and new mobile games.

**Street Fighter the leading title in the fight game genre.** Exhibit 70 shows the Twitch game ranking by total hours watched. The highest ranked games are in high-presence eSports genres, such as multiplayer online battle arena (MOBA) and first-person shooter (FPS) games. Street Fighter V has the top ranking in the fighting genre. As of May 2018, Capcom had held 92 Street Fighter V eSports tournaments, with total prize money of US\$1.95mn. By contrast, the total prize money for Tekken 7, a fighting game with which Street Fighter V is often compared, was US\$420,000, highlighting the clear lead Street Fighter V has over rival titles. Street Fighter still lags the top overall eSports titles, which include Dota, Counter-Strike, and League of Legends, by a long way, as these titles have cumulative prize money in excess of US\$50mn. However, the eSports market is gaining momentum, and we see significant growth opportunities for Street Fighter as eSports expands outside the current mainstream MOBA and FPS genres into fighting and sporting game genres. Capcom is also developing titles other than Street Fighter that we think have potential in the eSports market, including Monster Hunter World, which was released in February 2018 and had sold 7.5mn units as of end-March.

**Exhibit 70: Street Fighter has the longest viewing time in the fighting genre**

Ranking of game viewing time on Twitch



Source: NewZoo

**Capcom Pro Tour has performed well overseas and is finally coming to Japan.**

Capcom has held Capcom Pro Tour eSports tournaments since 2014. Capcom Pro Tour events are held in various countries throughout the year. The leading point scorers at the end of the year are invited to the Capcom Cup, where the overall tournament winner is decided. Street Fighter is one of the games included in the FY2018 tournament and Capcom has announced that total prize money will exceed US\$600,000. Capcom has focused eSports business development on overseas markets to date, but in a press release on February 13<sup>th</sup> it said it would ramp up eSports business development in Japan in response to the foundation of the Japan eSports Union (JeSU). The Capcom Pro Tour final will be held at the Tokyo Game Show in September. Japanese game companies have been lagging in the eSports market to date, but they are stepping up efforts in 2018. We think the domestic eSports market could now be set to take off.

**Logitech: Gaming shows significant growth potential with burgeoning opportunity in eSports**

Logitech is a leading provider of hardware peripherals including for creativity and productivity devices (e.g. mice and keyboards), music (including speakers and earphones), gaming (spanning console gaming headsets and specialised keyboards/mice for PC gamers) and video conferencing (through its affordable video conferencing solution).

Logitech has shifted from a hardware peripherals player with predominant exposure to a challenged PC market towards diversified exposure areas such as Video Collaboration, **Gaming** and Music which has allowed it to weather short-term fluctuations in one product category and to launch new products in a phased fashion. Continued operational

efficiencies (in house design & manufacturing) should support gross margins and, with opex leverage, drive a 15% EPS CAGR.

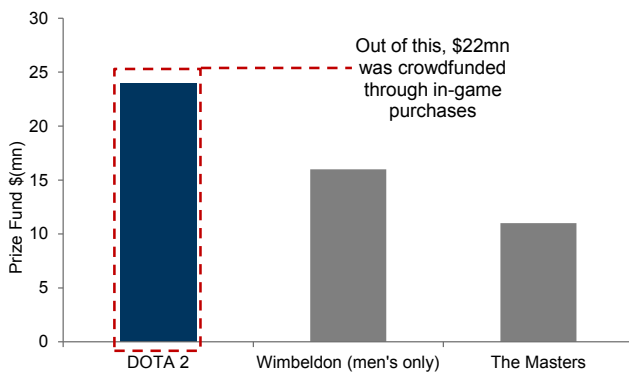
**Logitech gaming to see a revenue CAGR of 25% in FY2018-21E mainly driven by rapid growth in eSports.** We see rapid growth in Logitech’s gaming peripherals business for a sustained period of 5+ years (where it is present through gaming mice, keyboards and headsets) as a function of structural growth in the underlying computer games market (especially PC and to some extent consoles).

**We see certain categories of gaming peripherals benefiting more from these gaming trends.** Logitech holds the number one market share position in gaming mice but they are significantly under penetrated relative to the number of online game downloads, and we see the TAM expanding as well as product upselling opportunities as the technology (battery life, wireless charging) improves. Logitech is also a leader in high end gaming headsets for gaming consoles (after the Astro Gaming acquisition in 2017) and we see opportunity to gain share in the low end). Finally, it has a number two position in specialised gaming keyboards, but we believe it can gain share here too. Given that the two largest players in gaming peripherals together have c.50%-55% of the market, we believe there is still room for Logitech to gain share (e.g. vs weaker players with smaller R&D budgets).

**In our June 22 initiation (link) we include a sensitivity analysis of gaming revenues,** which suggests that in our upside case scenarios, which assumes 45%-55% pa growth in 2019E vs c.38% in our base case, there could be potential 11%-18% boost to our Logitech valuation.

**Exhibit 71: There is a willingness to spend on Gaming evident from in-game purchases...**

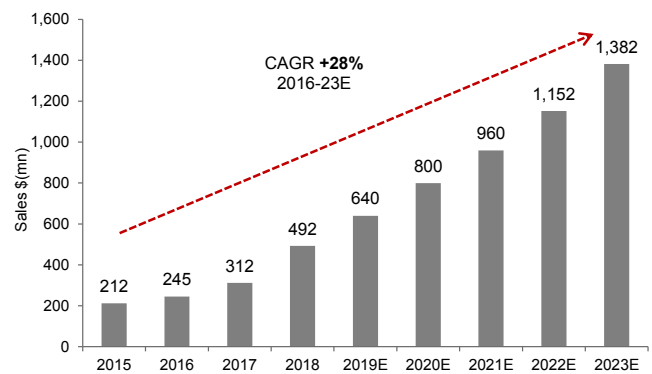
Prize Fund (\$ mn) vs other sports



Source: NewZoo, Goldman Sachs Global Investment Research

**Exhibit 72: ...and we see Logitech’s gaming revenues increasing at a CAGR of +28% in FY2016-23E**

Logitech’s Gaming revenues (FY2016-23E)



Source: Company data, Goldman Sachs Global Investment Research

**Logos disclosure**

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# Disclosure Appendix

## Reg AC

We, Christopher D. Merwin, CFA, Masaru Sugiyama, Piyush Mubayi, Toshiya Hari, Heath P. Terry, CFA, Alexander Duval, Heather Bellini, CFA, Drew Borst, Lisa Yang, Donald Lu, Ph.D., Garrett Clark, Charles Long, Wendy Chen, Yusuke Noguchi, Jacqueline Morea, Michael Ng, CFA, Daniel Powell and Hameed Awan, hereby certify that all of the views expressed in this report accurately reflect our personal views about the subject company or companies and its or their securities. We also certify that no part of our compensation was, is or will be, directly or indirectly, related to the specific recommendations or views expressed in this report.

Unless otherwise stated, the individuals listed on the cover page of this report are analysts in Goldman Sachs' Global Investment Research division.

## GS Factor Profile

The Goldman Sachs Factor Profile provides investment context for a stock by comparing key attributes to the market (i.e. our coverage universe) and its sector peers. The four key attributes depicted are: Growth, Financial Returns, Multiple (e.g. valuation) and Integrated (a composite of Growth, Financial Returns and Multiple). Growth, Financial Returns and Multiple are calculated by using normalized ranks for specific metrics for each stock. The normalized ranks for the metrics are then averaged and converted into percentiles for the relevant attribute. The precise calculation of each metric may vary depending on the fiscal year, industry and region, but the standard approach is as follows:

**Growth** is based on a stock's forward-looking sales growth, EBITDA growth and EPS growth (for financial stocks, only EPS and sales growth), with a higher percentile indicating a higher growth company. **Financial Returns** is based on a stock's forward-looking ROE, ROCE and CROCI (for financial stocks, only ROE), with a higher percentile indicating a company with higher financial returns. **Multiple** is based on a stock's forward-looking P/E, P/B, price/dividend (P/D), EV/EBITDA, EV/FCF and EV/Debt Adjusted Cash Flow (DACF) (for financial stocks, only P/E, P/B and P/D), with a higher percentile indicating a stock trading at a higher multiple. The **Integrated** percentile is calculated as the average of the Growth percentile, Financial Returns percentile and (100% - Multiple percentile).

Financial Returns and Multiple use the Goldman Sachs analyst forecasts at the fiscal year-end at least three quarters in the future. Growth uses inputs for the fiscal year at least seven quarters in the future compared with the year at least three quarters in the future (on a per-share basis for all metrics).

For a more detailed description of how we calculate the GS Factor Profile, please contact your GS representative.

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Across our global coverage, we examine stocks using an M&A framework, considering both qualitative factors and quantitative factors (which may vary across sectors and regions) to incorporate the potential that certain companies could be acquired. We then assign a M&A rank as a means of scoring companies under our rated coverage from 1 to 3, with 1 representing high (30%-50%) probability of the company becoming an acquisition target, 2 representing medium (15%-30%) probability and 3 representing low (0%-15%) probability. For companies ranked 1 or 2, in line with our standard departmental guidelines we incorporate an M&A component into our target price. M&A rank of 3 is considered immaterial and therefore does not factor into our price target, and may or may not be discussed in research.

## Quantum

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## Disclosures

### Coverage group(s) of stocks by primary analyst(s)

Christopher D. Merwin, CFA: America-Select Internet, America-Video Games. Masaru Sugiyama: Japan Internet and Games, Japan-Consumer Electronics, Japan-Media. Piyush Mubayi: Asia Internet. Toshiya Hari: America-Semiconductor Capital Equipment, America-Semiconductors. Heath P. Terry, CFA: America-Internet. Alexander Duval: Europe-Communications Technology, Europe-Semiconductor & Tech Hardware. Heather Bellini, CFA: America-Software. Drew Borst: America-Media and Entertainment. Lisa Yang: Europe-General Retail, Europe-Media. Donald Lu, Ph.D.: A-share Telecoms and Technology, Greater China Telecoms and Technology. Michael Ng, CFA: America-Media and Entertainment, America-Toys.

A-share Telecoms and Technology: Accelink Technologies, China United Network Comm, Dahua Technology, Fiberhome Telecom Tech, Goodix, Hikvision Digital Technology, Hytera Communications Corp., SG Micro Corp., Wangsu Science & Technology Co., ZTE Corp. (A).

America-Internet: Amazon.com Inc., Blue Apron Holdings, Booking Holdings Inc., CarGurus Inc., Criteo SA, eBay Inc., Etsy Inc., Expedia Group, GrubHub Inc., LendingClub Corp., Netflix Inc., Pandora Media Inc., PayPal Holdings, Redfin Corp., Snap Inc., Spotify Technology S.A., TripAdvisor Inc., Trivago N.V., Twitter Inc., Zillow Group.

America-Media and Entertainment: AMC Entertainment Holdings, AMC Networks Inc., CBS Corp., Cinemark Holdings, Discovery Inc., IMAX Corp., Interpublic Group of Co., Lamar Advertising Co., Lions Gate Entertainment Corp., Live Nation Entertainment Inc., Omnicom Group, Outfront Media Inc., Tribune Media Co., Twenty-First Century Fox Inc., Twenty-First Century Fox Inc., Viacom Inc., Walt Disney Co..

America-Select Internet: ANGI Homeservices Inc., Groupon Inc., IAC/InterActiveCorp, Match Group, Shutterfly Inc., Stitch Fix Inc., TrueCar, Yelp Inc..

America-Semiconductor Capital Equipment: Applied Materials Inc., Entegris Inc., Keysight Technologies Inc., KLA-Tencor Corp., Lam Research Corp., Teradyne Inc., Versum Materials Inc..

America-Semiconductors: Advanced Micro Devices Inc., Analog Devices Inc., Broadcom Inc., Integrated Device Technology Inc., Intel Corp., Maxim Integrated Products, Nvidia Corp., NXP Semiconductors NV, Qorvo Inc., Skyworks Solutions Inc., Texas Instruments Inc., Xilinx Corp..

America-Software: Adobe Systems Inc., Akamai Technologies Inc., Alphabet Inc., Atlassian Corp., Autodesk Inc., Citrix Systems Inc., Dropbox Inc., Endurance International Group, Facebook Inc., GoDaddy.com Inc., Microsoft Corp., MongoDB Inc., Okta Inc., Oracle Corp., Pivotal Software Inc., Red Hat Inc., RingCentral, Salesforce.com Inc., Twilio, VMware Inc., Wix.com, Workday Inc..

America-Toys: Funko Inc., Hasbro Inc., Mattel Inc..

America-Video Games: Activision Blizzard Inc., Electronic Arts Inc., Take-Two Interactive Software Inc., Ubisoft Entertainment SA, Zynga Inc..

Asia Internet: 58.com Inc., Alibaba Group, Baidu.com Inc., Ctrip.com International, Gridsum, iQIYI Inc., JD.com Inc., Jianpu Technology Inc., MakeMyTrip Ltd., NetEase Inc., New Oriental Education & Technology, Sea Ltd., SINA Corp., Sogou Inc., Sunlands Online Education Group, TAL Education Group, Tarena International Inc., Tencent Holdings, Vipshop Holdings, Weibo Corp., YY Inc..

Europe-Communications Technology: Ericsson, Ericsson, Gemalto, Nokia, Nokia, Spirent Communications Plc, Technicolor.

Europe-General Retail: adidas, ASOS Plc, Associated British Foods, B&M European Value Retail SA, CECONOMY, Debenhams, Dixons Carphone Plc, Europris ASA, Hennes & Mauritz, Inditex, Kingfisher, Maisons du Monde SAS, Marks & Spencer, Next, OVS SpA, Pets at Home Group, Puma, Rocket Internet SE, SMCP, Steinhoff International Holdings, Ted Baker, Tokmanni Group, XXL ASA, Zalando SE.

Europe-Media: Ascential Plc, Atresmedia, Auto Trader Group, Axel Springer AG, Daily Mail and General Trust, Emerald Expositions Events Inc., Informa, ITV Plc, JCDecaux, Lagardere, M6 - Metropole Television, Mediaset, Mediaset Espana, Modern Times Group, Naspers Ltd., Pearson, ProSiebenSat.1, Publicis, RELX NV, RELX Plc, Rightmove Plc, RTL Group, Schibsted ASA, Scout24 AG, Sky Plc, TF1, Vivendi, Wolters Kluwer, WPP Plc, ZPG Plc.

Europe-Semiconductor & Tech Hardware: ASML Holding, Infineon, Ingenico SA, Logitech, STMicroelectronics, STMicroelectronics.

Greater China Telecoms and Technology: China Communication Services, China Mobile (HK), China Mobile (HK) (ADR), China Telecom (ADR), China Telecom (H), China Unicom (ADS), China Unicom (H), Hua Hong Semiconductor Ltd., Mediatek, Parade Technologies Ltd., Silergy Corp., SMIC (ADR), SMIC (H), TSMC, TSMC (ADR), United Microelectronics Corp., United Microelectronics Corp. (ADR), ZTE Corp. (H).

Japan Internet and Games: Bandai Namco Holdings, Capcom, CyberAgent, DeNA Co., Kakaku.com, Konami, LINE Corp., Nexon, Nintendo, Rakuten, Recruit Holdings, Sega Sammy Holdings, Square Enix Holdings, Yahoo Japan.

Japan-Consumer Electronics: Panasonic Corp., Sony.

Japan-Media: Dentsu, Hakuholdo DY Holdings.

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Goldman Sachs Investment Research global Equity coverage universe

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	Buy	Hold	Sell	Buy	Hold	Sell
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