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UK video games

Heterogeneous not homogeneous

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Technology

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Over the past two to three years, we have seen the re-emergence of a listed small- and mid-cap games sector in the UK and Europe, with a wave of IPOs supported by a period of sustained outperformance of the industry majors against a backdrop of healthy equity markets. The more recent reversal of performance of the sector has been equally dramatic and largely indiscriminate. Mixed trading results from the industry majors reflect, in our view, the re-basement of expectations from unrealistic highs, as well as disruption from digital distribution and recurring monetisation models. The small-cap games sector mainly comprises companies with business models designed to exploit this new model, and trading for the most part has been robust. The dynamic nature of the market will continue to create disruption, offering opportunities and risks, but we believe the small-cap European sector now offers exposure to a number of well-run, innovative businesses and good execution will generate significant value.

A global industry offering double-digit growth

In 2018, western markets represented c 44% of global games revenues estimated at $138bn, with 51% of revenues on mobile devices. Overall revenues are forecast to offer 10%+ growth between 2017–21, with high-teens mobile CAGR, while PC and console offer single-digit growth (Newzoo).

Relative valuations look more attractive

Tensions over a US-China trade war, together with unsustainable expectations (eg for Electronic Arts, Activision Blizzard, Take-Two) and slowing mobile growth (eg Apple, Samsung, LG Electronics and Sony) have put pressure on the global tech market leaders and, consequently and indiscriminately, valuations across the technology sector. However, with strong secular growth, exposure to a hard-to-reach global youth audience and valuations down from the highs of Q218 and Q318, the small-cap European games sector offers an increasingly attractive proposition at these more subdued valuations. Tax breaks, particularly Video Games Tax Relief (VGTR), have been key to underpinning UK development, helping to level the international playing field.

Digitalisation is transforming business models

Digitalisation has significantly reduced the financial resources and capital intensity required to launch new titles, as well as offering the opportunity to sell downloadable content to sustain games and their communities post-launch – increasing the recurring revenue base and reducing the risk profile. Together, this has allowed greater business model diversity, more flexibility and better profitability, to the benefit of content owners and niche players.

Heterogeneous not homogeneous

The UK-quoted companies offer exposure to key global trends by way of different business models, and should not be considered as equal alternatives for a homogeneous sector. Company risk profiles differ significantly and investors need to consider carefully which is likely to best match their investment criteria.

UK and European companies mentioned in this report

CD Projekt (CDR.WA)
Codemasters (CDM.LN)
EVR Holdings (EVRH.LN)
Frontier Developments (FDEV.LN)
Game Digital* (GMD.LN)
Gfinity (GFIN.LN)
Immotion Group (IMMO.LN)
Keywords Studios* (KWS.LN)
MAG Interactive (MAGIN.ST)
Mercia Technologies* (MERC.LN)
Modern Times Group (MTGb.ST)
Paradox Interactive (PDXI.ST)
PlayWay (PLWP.WA)
Rovio Entertainment (ROVIO.HE)
Starbreeze Studios (STZE.ST)
Stillfront Group (SFRG.ST)
Sumo Group (SUMO.LN)
Team17 (TM17.LN)
THQ Nordic (THQNb.ST)
Ubisoft Entertainment (UBIP.PA)
VR Education Holdings (VRE.LN)

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Executive summary

Investing in the UK games sector – why is it different this time?

Games is a global industry: Perhaps the key difference this time, compared with the past, is that the games industry has grown exponentially and is no longer a fast-moving playground for amateurs, but instead is a focus for some of the world's largest companies. The market opportunity, ie the addressable player base, has ballooned in parallel.

Digitalisation: There have been a number of important changes to the games business model, particularly in relation to the move from physical content to digital distribution (squeezing the retailers, eg HMV, GameStop and Game Digital). Digitalisation has significantly reduced the financial resources and capital intensity required to launch a new title, as well as offering the opportunity to manage a game's community post-launch, offering downloadable content to sustain a game, increase LTV and maximise recurring revenues. Together, this has allowed greater business model diversity, more flexibility and better profitability.

Professional management: This latest wave of games businesses comprises companies with an established track record, run by professional management teams.

UK government support: Finally, the UK government's decision to foster and support games with the launch of Video Games Tax Relief (VGTR) in April 2014 is a critical success factor. Not only does it recognise video games alongside film and TV as a core creative industry, critical to the UK's future competitiveness, but it also rebalances the cost of operating in the UK, allowing the domestic industry to compete on an equal footing with, eg Canada, France, the US and Ireland, and other regions with significant industry tax breaks.

The games industry can still be a risky, hit-based business. The formula for success is hard to pin down and few companies achieve serial 'hits'; larger companies prefer to acquire proven IP and franchise successful titles rather than develop new hits themselves. The dynamic nature of the sector, where technology and creativity collide, means that volatility is inevitable. However, the shift to building community-orientated titles, serviced by downloadable content and expansion packs, to offer recurring revenue models helps to mitigate this risk, but it will never completely disappear.

Other factors to consider

Positives

- The old model of upfront inventory risk and cost is disappearing with physical product.
- Distribution costs are falling as high street retail is disintermediated.
  - There is still an online distribution toll to pay, but this is also falling.
- Power has shifted towards the IP owners and developers.
  - With IP owners able to self-publish, the route to market has become democratised.
- With diverse business models, there are games to suit every market.

Negatives

- The hit-based business model persists at the high end.
  - However, risk is being mitigated through a Games-as-service mentality.
- The retail channel remains crowded – there has never been more high-quality content.

Investment thesis

Games development in the UK is in good health, with the UK remaining one of the most important markets in the global video games industry. This remains a fragmented market with the quoted companies offering unique exposure to different industry segments and market dynamics.

Specifically considering investors wishing to invest in the UK games industry, we believe that the following factors should be borne in mind:

- In 2018, the UK was the sixth largest games market in the world with 2018 revenues of $4.5bn and 37.3 million people playing games (source: Newzoo).
- Western Europe accounted for $20bn of revenues and over 200 million gamers.

Reasons to invest in the games industry include:

- Exposure to strong forecast growth of >10% to 2021 (source: Newzoo);
- Singular exposure to a global youth demographic;
- The UK industry leads the world, well supported by the UK government's tax breaks;
- Businesses are more robust than in the early 2000s – stronger management, flexible cost bases and more diversified revenue profiles;
- Technological advances will only make games content more compelling; and
- Multiple avenues for future growth, including VR, AR, games-as-a-service (GaaS) and eSports.

Heterogeneous not homogeneous

The UK games sector has essentially re-emerged over the past 18 months, so it is tempting to consider an investment in the sector. In our view, however, we would highlight that this tier 1 analysis is not sufficient in itself – the five UK-quoted businesses (six if you include Game Digital), differ significantly in terms of risk profile and investors need to consider carefully which is likely to match their investment criteria most closely. Each company operates a different business model, with exposure to separate market segments, and should not be considered as equal alternatives for exposure to a homogeneous sector.

Trends, drivers and themes

We will build on this very brief introduction to the games sector in future notes, but as an industry primer, it is worthwhile to note and comment on some of the themes driving growth in the games sector today and in the near future.

Fortnite: Growing the audience, but with cannibalisation

What makes the games sector so exciting is that occasionally titles break out and 'go big' (eg *Clash of Clans*, *Candy Crush*, *Grand Theft Auto IV*, *World of Warcraft*). *Fortnite* is the latest of these titles. Developed by Epic Games (US, private), after the title's *Battle Royale* format captured the gaming public's imagination, *Fortnite* has now attracted over 200 million registered users with 8.3 million concurrent players. The title is free to play (zero upfront cost), but monetised by the sale of in-game downloadable content, primarily cosmetic enhancements to a player's characters (Epic is rumoured to have made profits in 2018 of US$2–3bn).

As well as cannibalising existing gamers, *Fortnite* has reached new audiences, so although a drag on competitor revenues in the short term, the title has likely expanded the overall games audience in the long term. How long will this phenomenon last and what title will be the next 'big thing'?

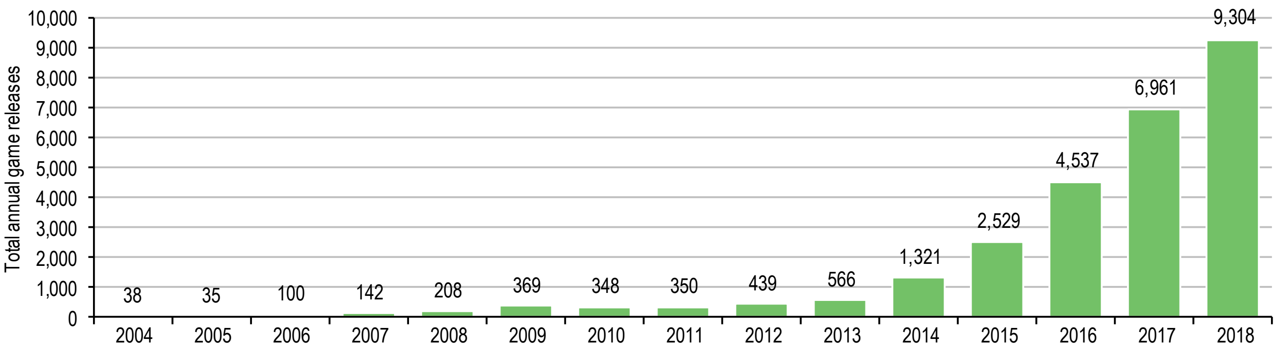
The scale of *Fortnite's* success has also allowed its developer, Epic Games, a platform to challenge the incumbent digital distribution platform, Steam, owned by Valve (see below for more detail).

Digital distribution: Transformational to all business models

Digital distribution has been to the benefit of all IP owners – developers can now afford to self-publish – but has marginalised retailers, forcing them to evolve their business models.

As with other industries, one of the big revolutions in gaming over the past 10 years has come from the transition from physical distribution of content (ie DVDs) to digital downloads.

Exhibit 1: Numbers of games released on Steam (PC-only games distribution platform)



Source: Edison Investment Research, SteamSpy data

This has allowed publishers to significantly reduce game launch costs (development and marketing costs remain) and avoid the sharp price falls that followed if initial sales were slower than forecast. Digital distribution offers a more flexible model, whereby games can be launched in limited Beta (ie playable but not fully debugged and polished) within a gaming community (for final testing and community engagement) and only formally launched when the game is ready, benefiting from feedback from the test community.

Importantly, this model also allows publishers to launch to a global audience without stock risk or the need to discount prices heavily post-launch.

Platform pricing competition: Epic rocking the boat

Cheaper distribution is an unexpected bonus to both consumer and IP owner, particularly the most digitally advanced. Steam is well established and continues to provide a great service at a now reduced cost to larger publishers, but, needless to say, any reduction in overall distribution costs flows straight to the bottom line of IP owners.

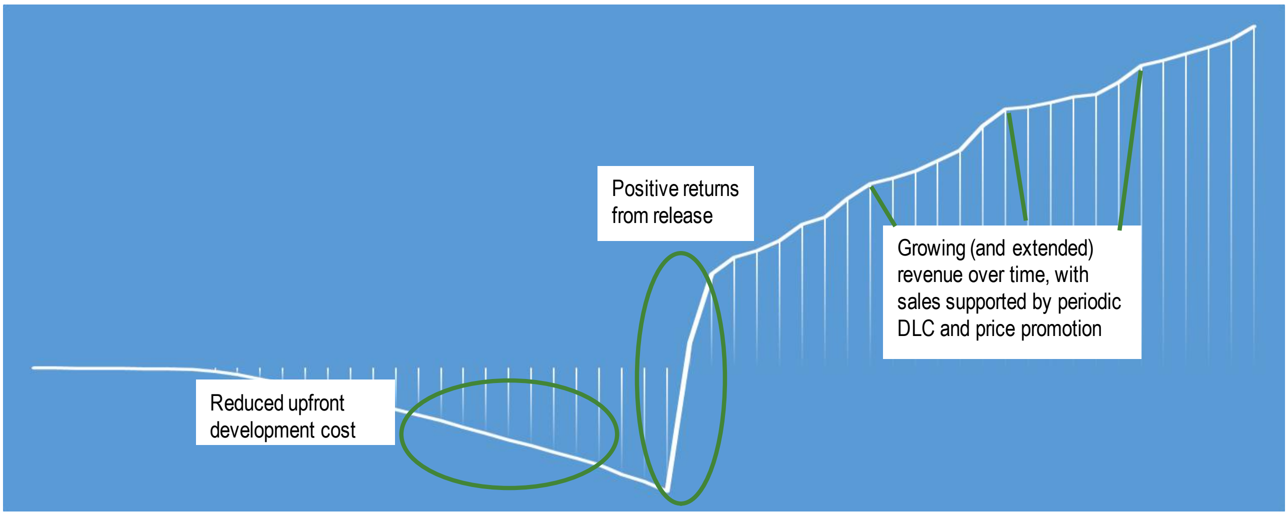
Using the success of *Fortnite* as a Trojan horse, in Q418, Epic Games announced a challenge to the incumbent PC digital distribution platform, Steam (90% market share). Epic Games proposes to take just 12% of revenue from titles hosted on its platform, leaving 88% for the publisher, down from the established norm of a 30/70 split (Apple, Google and the console platform holders remain at 30%). In response, Steam reduced its revenue share to 25% (from 30%) for revenues in excess of $10m, and 20% for revenues above $50m – annoying small, independent developers but appealing to big publishers. Discord, a US-based messaging app developer for gamers, is looking to go further, offering developers a 90/10 revenue split. Other notable digital game stores include GOG (owned by CD Projekt), Humble, Itch and Kartridge.

Games-as-a-Service (GaaS): Significant risk reduction

GaaS describes the ongoing relationship with a game's community post-launch, where the game developer manages the community and provides additional content or events (whether for free or at a charge) to extend the life of the game and increase its lifetime value (LTV).

Digital distribution has allowed a secondary revolution, whereby shorter, more limited core games can be launched, reducing upfront (ie risky) development costs, and then added to by way of downloadable content (DLC) over time, based on user feedback and demand (ie far less risky) to sustain the game's community. Free or premium content can be used to improve the game and offer an opportunity for incremental future revenue from the title, drawing out the revenue profile, extending its life and strengthening the ongoing direct relationship between the publisher and the game's community.

Exhibit 2:GaaS cash flow profile



Source: Frontier Developments, Mello London, November 2018

The GaaS business model underpinned by DLC is now established throughout the industry and is an important revenue stream for, eg Sumo Group, as well as a core part of Frontier Developments' business model.

Console cycle: Not such a concern, but coming

We expect a 2020/21 launch, but will Sony break first (the PS4 is leading this generation, but is showing its age) or Microsoft (losing this generation and trying to get a head start for the next)?

In the early 2000s, the console cycle was an ever-present factor overhanging the sector. Typically, every seven years or so, as the previous generation of hardware started to show its age, a new generation of hardware consoles was launched, building up a user base and seeking to monetise its audience to recoup the huge costs of developing and establishing the console.

Although the games sector is not dominated by the economic cycle, it is subject to the console cycle. With console sales, a smaller part of an expanding pie (vs online, PC, mobile, casual), together with the ability to remotely update platform software periodically with the increasing virtualisation of the console, the games sector as a whole is far more insulated from the cycle today than historically. Nevertheless, although timing is not certain, transition work has started, with 2020/21 being the expected window. We should hear more later this year.

Transition has a huge cost to the hardware manufacturers, Sony, Microsoft and Nintendo, but also delivers a 'walled garden' (where the user has restricted access to approved content and services) to their future benefit once the platform base is established.

Google has also thrown its hat into the ring with a streaming console codenamed Project Yeti. Amazon, too, is shortly expected to announce a streaming console.

Streaming/subscriptions: A transformative model?

Streaming (subscription-based models) is just around the corner for the back catalogue, but it may still be some time before front-line games are available to stream.

The 'next big thing' (although it is still a number of years away from significant user penetration) is streaming, whereby the game resides and is rendered in the cloud, and streamed live to a 'dumb' (or depowered) console. This approach requires robust global communications infrastructure, reduced latency and high-bandwidth, low-cost distribution.

Whether a publisher model or a channel model (think Netflix or Spotify), significant investment is going into developing effective video game streaming models and the associated hardware. There are rumours that Microsoft's next console will feature both a cloud-based box that streams content and a home console as a hub. A number of the major publishers are also investing in this technology. The end game is that the publisher/console owner has a direct relationship with the consumer and the ability to offer content direct, by way of a subscription.

However, internet infrastructure in many core jurisdictions will need to improve markedly for streaming to become mass-market; latency and lag are currently prohibitive and are likely to remain so for years to come. However, ultimately, the lure of a subscription-based model will be compelling to both publishers and console manufacturers, even if only to monetise their archive of older titles.

This trend can be played through major publishers (eg Electronic Arts), the console manufacturers (Microsoft, Nintendo, Sony and Google) and cloud service providers (Google, Amazon, Microsoft).

eSports: A driver of future growth

From an investor's perspective, although eSports is a technology with an evolving impact on the industry, the main beneficiaries are Google and Amazon. Pure-play exposure is hard to identify beyond a few specialist eSports companies.

eSports is another revolution in the games industry that will have a significant impact on its future development, but which today has relatively low visibility beyond its select audience. eSports are organised, multiplayer video game competitions, with sponsored professional players and teams.

Once upon a time, gaming was for the solitary player holed up in their bedroom, but that view is now outdated, with online collaborative games growing into eSports (eg *League of Legends*, *Counter-Strike*, *Overwatch* etc). Bizarrely (at least to an outsider), even titles such as *Farming Simulator* are now forming an eSports league. The necessary ingredients to success appear to be multiplayer titles with a strong community of sufficient size and players with a competitive edge. The audience will choose itself.

Today, eSports provides a further way to build a community around successful titles, extending the life of the game, growing its audience and providing ancillary revenue streams from advertising, sponsorship and merchandising.

These events can draw huge live-streaming audiences on Twitch/YouTube (as well as highlights for download) wanting to watch leading players show their mastery of the game.

Producers of games that may offer attractive future exposure to eSports include Activision Blizzard (for first-person shooters), and potentially Electronic Arts (FIFA, NBA) and Codemasters, who announced a global eSports partnership with Motorsport Network in February 2019, starting with its latest title *Dirt Rally 2.0*. Otherwise, pure-play exposure is hard to identify beyond a few specialist eSports companies, eg Gfinity in the UK and MTG in Sweden. eSports is also a core part of Game Digital's strategy.

Virtual reality/augmented reality

One of the major drivers behind the evolution of gaming hardware is the development of virtual reality (VR) and augmented reality (AR). Could a compelling consumer proposition appear in 2019, or 2020 or 2021? It is hard to say, but for the moment, while waiting for the consumer proposition to develop, the best commercial propositions can be found in out-of-home and enterprise VR solutions.

Gartner's Hype Cycle analysis suggests that Enterprise VR has already arrived as a commercial proposition, but AR and consumer VR are still travelling the curve.

Exhibit 3: Hype cycle for emerging technologies – 2018

Source: Polar Capital Technology Trust (December 2018)

VR is where the user is offered total immersion in a virtual world via goggles or a headset, whereas AR is where a digital user interface is laid across the real world through a pair of glasses or other eyewear (think of a fighter-pilot's heads-up display), allowing a mix of real and virtual objects.

These technologies have been held up as the future of gaming, offering a more compelling and immersive experience than current screen-based technology. However, the sector is still waiting for mass-market consumer adoption when hardware and content come together to offer a compelling consumer experience at an attractive price point.

Mass-market consumer adoption requires convergence of three principal factors:

1. Hardware – wireless, lightweight, six degrees of freedom (6DOF), ready-to-wear glasses
2. Content – variety of compelling, immersive titles
3. Price point – < $200

The Oculus Quest headset (Oculus is owned by Facebook) is due to launch in Q119, and could be a big step forward, but a choice of compelling content is still needed for success. Industry insiders suggest mass-market consumer take-up could be seen as early as 2020/21.

However, today, an attractive commercial proposition can be found in 'out-of-home' and enterprise VR solutions, where exposure to high-end experiences can be offered commercially, or where the cost savings or other strategic benefits to the enterprise outweigh today's limited experience.

There are a small number of UK-quoted companies offering exposure to VR: EVR Holdings (live concerts); VR Education (education); and Immotion Group (out-of-home VR). Additionally, one of Mercia Technologies' largest holdings ('Emerging Stars'), nDreams, is a leading VR video game developer (Mercia Technologies is an Edison client and a detailed review of nDreams can be found in our initiation note from October 2018: Mercia initiation).

Mobile content: Slowing, but still driving global growth

The UK-quoted games companies offer minimal mobile exposure, as the more casual player base, the dominant freemium model and intense competition all contribute to an unattractive risk profile.

The fastest-growing segment of the games sector remains on the smartphone, where Newzoo forecasts global growth continuing at an IRR of c 19% from 2017–21.

Mobile offers the potential for huge scale and penetration, but monetisation is only becoming harder as premium titles struggle with the swathe of free content available, meaning that the most relevant business model is free-to-play (no up-front cost, discretionary micro-transactions and premium content).

From a games perspective, mobile remains a casual medium where tastes, fads and fashions move quickly, but meaningful revenues are hard to achieve. As a result, mobile gaming is not a core focus for a number of major games companies, eg Ubisoft, Frontier Developments. Activision Blizzard retains significant exposure to mobile through its acquisition of King (maker of *Candy Crush*), while Glu, Zynga, MAG interactive, Stillfront and Rovio (*Angry Birds*) offer pure-play quoted company exposure. In the UK, Codemasters has recently signed a significant deal for a mobile racing title with NetEase targeting a Chinese audience and Team17 offers a range of mobile and casual titles.

On mobile, consumer recognition is incredibly powerful, with the consumer drawn to names/IPs that they know and recognise, particularly those titles being played by their peers. This tends to reward successful titles (success begets success) and make the slope even more slippery for new IP. This phenomenon is highlighted by AppAnnie's *The State of Mobile 2019*; incumbency matters:

Exhibit 4: Top smartphone games by monthly average user (MAU), 2018

	Brazil	Canada	China	France	Germany	India	Japan	South Korea	US	UK
1	Free Fire	Candy Crush Saga	Anipop	Candy Crush Saga	QuizClash	Ludo King	Disney Tsum Tsum	PUBG Mobile	Pokemon GO	Candy Crush Saga
2	Candy Crush Saga	Pokemon GO	Honour of Kings	Clash Royale	Candy Crush Saga	Candy Crush Saga	Monster Strike	Clash Royale	Candy Crush Saga	Helix Jump
3	Helix Jump	HQ - Live Trivia Game Show	PUBG: Exciting Battlefield	Pokemon GO	Pokemon GO	PUBG Mobile	Pokemon GO	Rider	New World With Friends	Pokemon GO
4	Cartola FC Oficial	Helix Jump	Landlord Poker	FDJ	Helix Jump	Clash of Clans	Puzzle & Dragons	Pmang New Mango	HQ - Live Trivia Game Show	8 Ball Pool
5	Clash Royale	Wordscapes	Mini World Block Art	Clash of Clans	Clash Royale	Doodle Army 2: Mini Militia	Knives Out	Everybody's Marble	Helix Jump	MobilityWare Solitaire

Incumbents: published prior to 2018

New titles: published during 2018

Source: AppAnnie, The State of Mobile 2019

Gaming in China: The thaw has arrived

The size of the Chinese market is hard to ignore, but cultural differences mean that many western IPs are not relevant. Western companies usually choose local partners to tackle the key Eastern territories individually. The recent hiatus in Chinese regulatory approvals has affected the pace of growth for mobile games in China as well as encouraging the local incumbents to look for growth (and diversification) overseas (see Exhibit 5 below).

The Asian markets have evolved independently to western markets, with cultural differences helping to shape different styles of game, gameplay and business models.

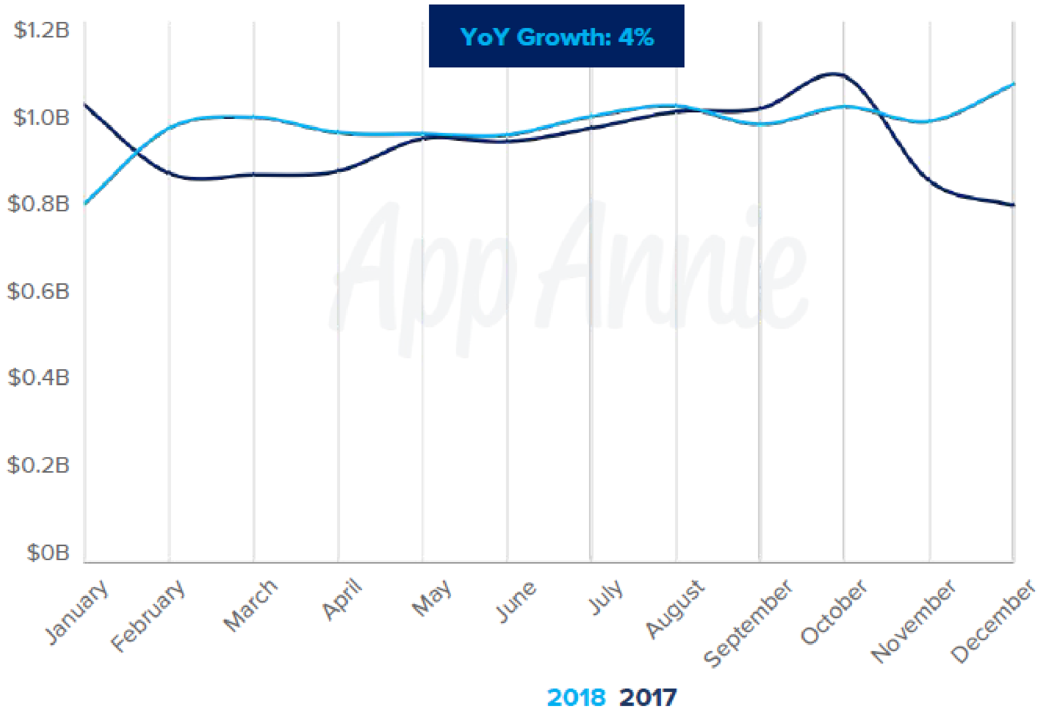
Japan, with two of the global console manufacturers (Sony and Nintendo), has greater crossover to western markets than China or Korea, the two other largest games markets. In 2018, a change to censorship and regulatory responsibilities brought the new games pipeline in China to a grinding halt, significantly affecting the major games companies, Tencent and NetEase. Games approvals restarted in December 2018, but only a few titles in a huge backlog have been released (to date).

Western studios are now more focused than ever on the opportunity offered by the Chinese audience, but games that are suited to such different markets are rare.

Most developers will partner with one of the strong local players, one of the BATs (Baidu, Alibaba, Tencent) or NetEase, to optimise games for the Chinese market and manage distribution of a game that complies with local requirements for censorship and regulation.

With a huge choice of local hardware manufacturers, the VR market in Asia has also followed a different development path than in the west with VR content largely free-to-play. As a consequence of this ecosystem, hardware sales are significantly ahead of the west, but the quality of game content is generally poor.

Exhibit 5: Chinese consumer spend on games (US$bn)



Source: AppAnnie, The State of Mobile 2019

Video Games Tax Relief: Benefit to the bottom line

The benefits of the Video Games Tax Relief (VGTR) are considerable to many of the major UK developers.

The video games tax credit regime was introduced on 1 April 2014 as part of the British government's broader efforts to support the creative industries in the UK. It provides a tax credit of up to 20% of production costs for developers of commercial video games (on all platforms – PC, console, mobile etc) that are certified as culturally British.

To be eligible the video game development company (VGDC) must be responsible for the majority of the planning, designing, developing, testing and producing of a game, with a minimum of 25% of eligible costs incurred in the EEA.

The VGTR regime has been well received and will continue until 2023 at the earliest (and may well be extended further), helping to support games development in the UK for the foreseeable future. The relief can be claimed for eligible games, though in practice not all developers claim the relief.

We see VGTR as a significant boost to the UK industry to maintain its global competitiveness. Although a future government could amend (or even curtail) the relief, this would seem to us to run counter to two government initiatives: 1) the broader initiative to support UK SMEs to generate employment; and 2) to support UK-based creative industries.

VGTR is a significant benefit for a co-developer such as Sumo Digital and games-engine owning developers such as Codemasters, whilst Frontier Developments prefers the alternative path of applying for R&D tax relief.

Brexit's long shadow

We hesitate before mentioning Brexit given the political and economic uncertainties it raises, not to mention the passions. However, looking at the UK sector in 2019, it at least deserves a mention.

In our assessment, the impact of Brexit on the UK video games industry will be negative, although as an international, largely digital service industry, the games sector is well placed by comparison with many other industry sectors.

A report by Games4EU (an anti-Brexit body) states: 'We need to move our games (both digital and physical), our consoles and our people around the UK and EU – fast and frictionlessly (often referred to as 'just in time' mechanisms). We depend on the regulatory system to enable digital access to our products across the EU.'

We would highlight the key, identifiable issues as:

1. increased business uncertainty, leading to additional costs, management distraction and contingency planning;
2. staff attraction and retention – games companies employ skilled (but not necessarily highly paid) staff from around the world. At the margin, EU citizens may be less likely to come to the UK, but for those who do, larger companies are already geared up to obtain visas for staff, a necessity that will presumably extend to include EU staff;
3. sharing IP and data across borders – as well as concerns over data protection, thought may need to be given about where work is done, what value has been added and how value-add is accounted for and taxed, with the potential for increased costs for products and services; and
4. as a way to circumvent some of these issues, larger UK companies may choose to open EU studios, eroding potential future employment growth in the UK.

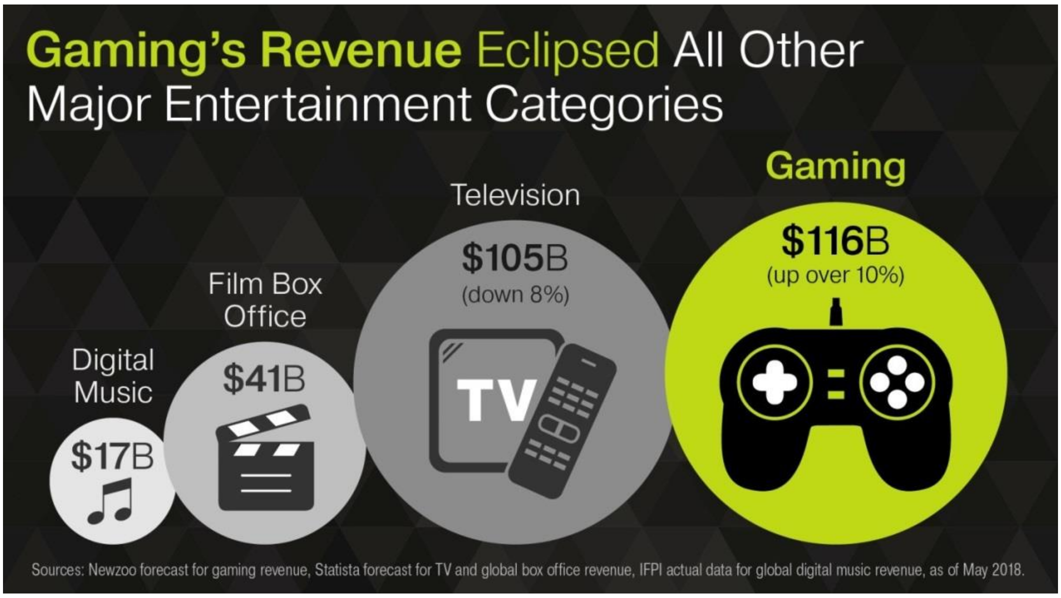
In summary, from an industry perspective, we expect a series of marginal losses, increasing friction and eroding the UK's competitiveness, with little identifiable benefit in return.

Games is 'big and growing'

A brief history

The video games sector first emerged in the 1970s, with games such as *Pong*, *Space Invaders* and *Pacman*. The first games console was the Magnavox Odyssey – released in 1972 – though many still remember the Atari 2600 as their first console. These arcade games evolved into games such as *Super Mario Bros* on home consoles such as the NES and Elite on the BBC Micro. What started out as a niche pastime for technology-obsessed nerds in the west in the 1970s was adopted by bedroom coders in the 1980s and subsequently developed into an identifiable industry in the 1990s. The games sector has now evolved into a global business that is larger than film, TV or music.

Exhibit 6: Games – a global business larger than film, TV or music



Source: Newzoo

Underlining games' supremacy, the most valuable media IP is also a video game: GTA V is recognised as the 'most financially successful media title of all time' with 90 million sales worldwide, and $6bn in revenue.

From the initial inception on PCs, games have proliferated and have now been developed for all platforms and devices, offering compelling content wherever you are and whatever you are doing. Games have also evolved from a physical boxed product (cartridge, floppy, minidisk, CD or DVD) to a digital download; essentially all games content is now downloaded for smartphones and digital download is rapidly increasing for the larger file sizes on PC and console.

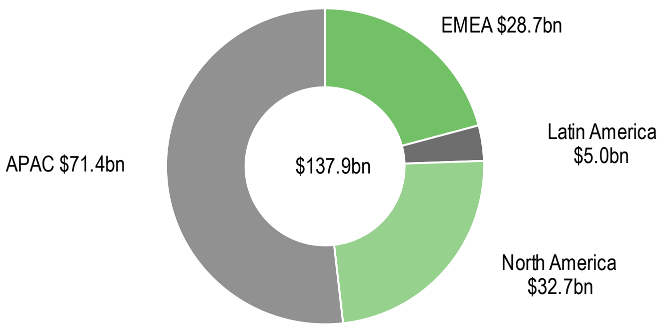
With the prospect of eSports, VR and AR, there are still plenty of technological hurdles to be surmounted towards ever more compelling and immersive gaming. And with the prospect of streaming content, games-as-a-service and increasing digitalisation, business models will continue to need to adapt to this rapidly evolving space.

The global games market

It is useful to look at the global market as a whole, though recognising that there are significant differences between regions and countries, particularly in terms of platform (mobile vs console/PC), the balance between male and female gamers as well as cultural preferences that have an impact on content and playing style.

Looking forward, the largest single market will continue to be China, forecast by Newzoo to reach $50.7bn in 2021, with a CAGR of around 10% from $37.9bn in 2018. Asia-Pacific will remain the highest growth region (extending its lead), with the fastest-growing markets in the coming three years, India and other countries in South-East Asia, as well as China.

Exhibit 7: The global games market, by region – 2018



Source: Newzoo

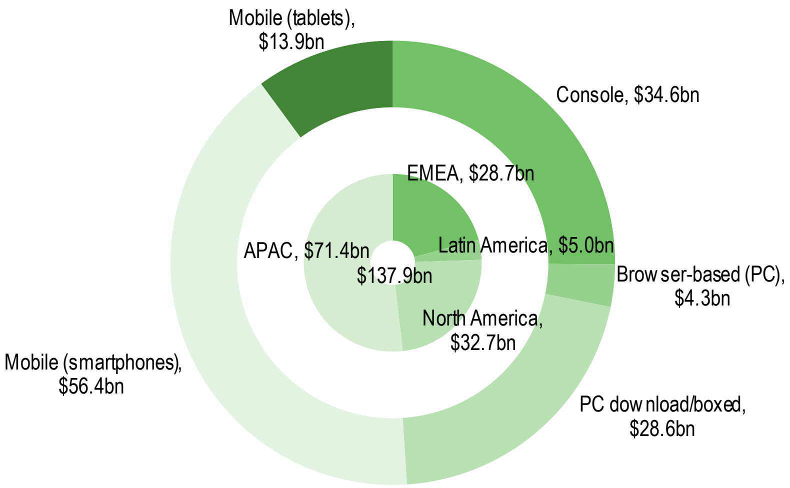
In terms of 2018 games revenues, the Asia-Pacific region is clearly the largest global gaming market, having generated $71.4bn in 2018 (16.8% y-o-y growth), 52% of the global total. This growth has been largely driven by the growth and increasing penetration of the smartphone, for which the region has, by far, the largest user base.

North America remains the second-largest region, with revenues of $32.7bn (a 10% y-o-y increase), representing 23% of the global total. EMEA is half a step behind, with revenues of $28.7bn (+8.8% y-o-y), representing 21% of the global market, while Latin America, with $5.0bn of revenues, represents the remaining 4%.

The mass-market is mobile

The gaming industry remains in a healthy state overall with growth continuing in all major segments of the games industry: mobile, console and PC.

Exhibit 8: The global games market, by segment – 2018



Source: Newzoo, Edison Investment Research

Mobile gaming (smartphone and tablet gaming) was the largest single segment of the games industry in 2018, expected to have generated $70.3bn, accounting for 51% of the total global market. The segment also accounts for the largest player-base with 2.2 billion games players, the majority of whom use smartphones (as opposed to tablets or traditional handsets).

It is worth highlighting that, for the UK-quoted games companies at least, mobile exposure remains extremely limited (despite Codemasters' recent announcement of a valuable F1 licensing deal with NetEase to target Chinese mobile users) as the more casual player base, the dominant freemium model and intense competition all contribute to an unattractive mix. Stripping out mobile growth, global PC/console growth is significantly slower, below 5% to 2021.

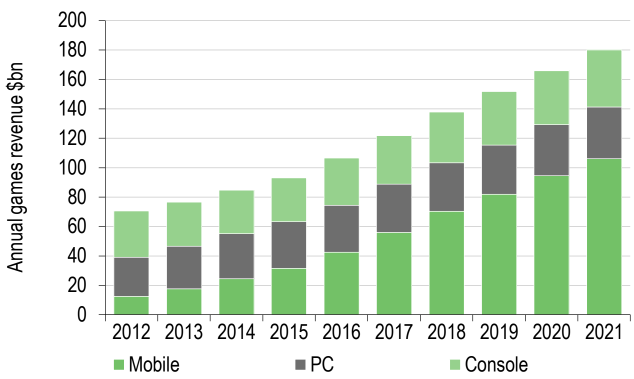
Console is the second-largest segment with revenues of $34.6bn in 2018. This will grow to $39.0bn in 2021, a CAGR (2017–21) of 4.1%.

The third-largest segment, PC, is expected to have generated $32.9bn of revenues in 2018. Continuing growth in downloaded/boxed PC games has been moderated by declining browser PC revenues, as browser gamers have largely transitioned to mobile.

Combining these two cuts into the data, when we look for the intersection between segment and region, the dominant class are mobile phone users in the Far East, with China far and away the most important single territory.

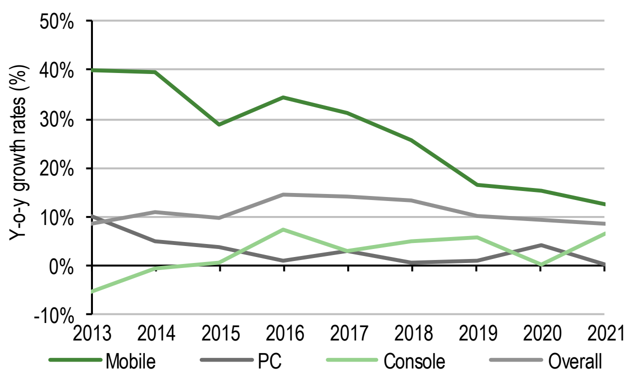
Looking ahead

Exhibit 9: A decade of double-digit growth



Source: Newzoo, Edison Investment Research

Exhibit 10: Slowing mobile growth dynamic



Source: Newzoo, Edison Investment Research

Where does future growth come from?

Overall games revenues are forecast to grow in excess of 10% between 2017 and 2021 (Newzoo), meaning that the games sector will have experienced a decade of double-digit annual growth by 2021. However, this high-level growth conceals divergent trends.

Firstly, much of this growth is attributable to the largest games sector, mobile, with a forecast CAGR of over 17% to 2021.

As a note of caution, the latest results from Apple, Samsung, LG Electronics and most recently Sony, suggest that global mobile growth may well be slowing, with smartphone adoption now close to saturation. Additionally, with the Chinese authorities having only just restarted approvals for new games in China, following a nine-month freeze on new game approvals, this source of mobile games growth is also likely to be constrained at least in the short term.

By comparison to mobile, although still offering attractive growth, PC and console are forecast to grow by a CAGR of approximately 4% and 5%, respectively, over the period, reflecting the relative maturity of the offering on these platforms.

Games retailers – the long tail continues to wag

Although not considered by Newzoo, the latest data from GfK/UKIE showed that the revenue generated from boxed video games in the UK declined by 2.8% y-o-y in 2018 to £770m, dropping by 7.1% to 22m units in terms of unit sales. This flags the challenges faced by retailers such as Game Digital, HMV, Green Man Gaming *et al* to stay relevant as their traditional business is digitalised. In parallel to the travails of GameStop in the US, these companies are rapidly seeking to evolve their business models to incorporate community and experiential elements, merchandising and digital sales to retain relevance as distribution moves online.

From another perspective, it is interesting to understand why physical sales are so enduring in what is an increasingly digital industry. This appears to be a factor of: 1) games sales being tied to hardware (ie console) sales; and 2) the prevalence of family gifting, where family members prefer that the recipient has a present to unwrap rather than just handing over a digital download code.

Game Digital's experiential strategy

As an example of how retailers are reacting to an increasingly digital distribution model, Game Digital's strategic priorities in its 2014 IPO prospectus were to:

1. maximise market share of console physical content;
2. maximise market share of console and non-console digital content;
3. promote pre-owned products to both capture market share and grow the absolute market; and
4. broaden product and service offering and target a broader gaming community.

Since IPO, Game Digital has placed progressively more emphasis on 4 above, linking its market development primarily to the customer experience, while relying on that relationship to attract related product sales. This has led to its increasing focus on events, eSports and digital.

In February 2018, in line with this increasing emphasis, Game Digital signed an agreement with its 25% shareholder, Sports Direct, to accelerate the roll-out of its BELONG gaming arena concept and GAME retail units. It commits to develop these in a range of formats:

- BELONG arenas in or next to GAME retail stores;
- BELONG arenas in Sports Direct retail stores;
- GAME retail stores within Sports Direct retail stores; and
- BELONG arenas with GAME retail stores, within Sports Direct retail stores.

The market recognises that Game Digital has significant execution risk around this change strategy, with the shares currently trading at c 28p, below end July 2018 net cash of 57p. Game Digital is a client of Edison.

Valuation and investment considerations

Focusing in from an investment perspective, what can be learnt from the past?

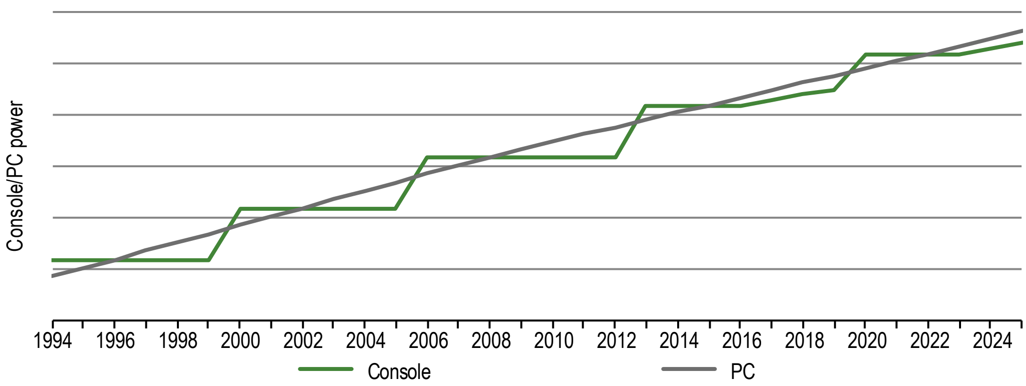
Cyclicality

Historically, the games industry has been fairly resilient to the broader macroeconomic cycle, though still exposed to the console cycle (eg transition from PS3 to PS4 and Xbox360 to Xbox One). The apocryphal example is that when times are tough, people go out less and spend more time at home; along with Netflix, games offer cost-effective in-home entertainment.

Looking ahead, although dynamics are hard to forecast, with the high growth of the games industry over the past two decades and more (Newzoo forecasts double-digit growth to continue throughout the decade), the global games industry is now so broad that its growth can no longer be considered to be independent of the consumer cycle. As such, games consumption is likely to correlate more closely to global consumer trends than it has in the past.

With the prospect of a looming consumer slowdown, coupled with a coming console transition likely to be announced later this year, there are definitely obstacles to continued growth on the horizon.

Exhibit 11: Schematic showing the relative capabilities of PC and console over the cycle



Source: Edison Investment Research

The coming console transition: 2020 or 2021?

We believe that the console transition is more likely to be in 2020 (or even 2021), rather than 2019 as, talking to publishers, there appear to be few if any rumours of development kits (specialised versions of the new consoles that allow developers to create and test games for the new hardware) widely in the market. Although the release date tends to be a closely guarded secret for financial and strategic reasons, it is hard to suppress all noise and rumours inevitably leak into the market.

As we move towards the end of the cycle, games companies focus more on sequels than new IP, releasing evolutionary iterations of existing titles rather than taking the risk of trying to establish new titles on hardware that is reaching the end of its lifecycle. Games teams have now optimised their approach and processes for the current generation of consoles, with little further technological edge to be found from the hardware.

Sony's PS4 has dominated Microsoft's Xbox One in the current generation, but it appears closer to the end of its lifecycle than the Xbox One. Even so, Sony may choose to let Microsoft make the first move to try to get a competitive edge for the next-generation console battle, and be a fast follower.

For these reasons, with serialisation and relative under-investment in new IP evident in 2018, there is likely to be increasing pricing pressure as the year progresses, as titles compete for end users with other well-established franchises.

It will be critical to the success of the next-generation of consoles that there is a vibrant ecosystem of titles (a mix of established franchises and new IP) available at launch, developed by the console owners themselves (more likely to take risks to establish new IP to differentiate their platform) as well as by third-party publishers. This will be a critical factor behind who 'wins' the next console cycle. As such, before the console transition is formally announced, development kits will have been released to major developers and publishers so that they can start to get to grips with the new consoles and technology for early release of key titles on the new hardware.

With the cost of large teams at many of the major publishers tied up with launch titles for the new consoles, there are likely to be fewer resources dedicated to other titles. This could either mean that stretched resources are concentrated on key titles or that publishers will need to rely more heavily on outsourcing and work-for-hire studios to take up the slack.

Once manufacturers confirm the new console launches, 2019 could be a choppy year, with more marginal developers/publishers seeing increasing pricing pressure focused on the current platforms rather than investing in the next-gen consoles.

There is likely to be increasing polarisation between premium titles (established AAA franchises) and affordable games (low-cost, innovative, discretionary) with a squeezed middle of good or solid games that fail to achieve good reviews (75%+ on Metacritic) that consequently disappoint at retail; recent examples of titles that fell between the cracks include Starbreeze's *The Witcher IV* and Bethesda's *Fallout 76*.

Investing in the UK games sector: A brief history

From an investor's perspective, it is important to have an understanding of why the quoted games sector is different this time around relative to its previous foray onto the public markets (1990s–2000s), from which time none of the UK companies now survives independently.

'One of the problems in the UK that caused a lot of damage was that there were a lot of unsuccessful IPOs in the 1990s. If you look at Eidos, Argonaut...the City still remembers it. It's astonishing. And it has taken a while to get beyond that.'
David Braben, CEO, Frontier Developments

'I don't think I truly appreciated the reputational damage to the industry in that era', Debbie Bestwick says. 'Certain names get brought up... nobody talks about them these days, but in the City they still remember.'
Debbie Bestwick, CEO, Team17

Exhibit 12: The class of the 2000s

Company	Role	Founded	IPO	Exit	Summary
Argonaut Games	Developer	Founded as Argonaut Software in 1982	1999	2005	Work for hire developer that ran out of cash following a series of underperforming projects. Went into administration in 2005.
Eidos Interactive	Publisher	Founded as Domark in 1984	1995	2005	Over-reliant on a single IP, *Tomb Raider*. After profit warning and in financial distress, received bid from Elevation Partners (PE) in March 2005, favoured offer from SCi Entertainment. SCi remained independent until 2009, before a distressed sale to Square Enix.
Empire Interactive	Publisher	Founded in 1987	2000	2006	Budget publisher, struggled for cash for a number of years before being acquired by Silverstar Holdings from the US.
Rage Software	Developer	Founded as Rage Games in 1992	1996	2003	Rage expanded into publishing and went bankrupt in 2003 following a series of games that underperformed.
SCi Entertainment	Publisher	Founded in 1988 as Sales Curve International	1996	2009	SCi followed a low-budget, developer-lite outsourcing model until its acquisition of Eidos in 2005. Having acquired Eidos, it then ran into a similar cashflow problems a few years later: over-reliant on single IP, *Tomb Raider*. Following the acquisition of Eidos in 2005 and the departure of the founding team in 2008, SCi remained independent for a further year before a distressed sale to Square Enix in March 2009.

Source: Edison Investment Research

As can be seen from the table above, even the first wave of UK public games companies had 10–20 years of trading history at the time; these were not new companies. However, they had (largely) been founded by enthusiastic amateurs and operated within an entrepreneurial sector that was rapidly evolving; the challenges of keeping pace, while managing and growing a sustainable business were significant.

Investing in the UK games sector: Why is it different this time?

In a nutshell:

Games is a global industry: Perhaps the key difference this time, compared with the past, is that the games industry itself has grown exponentially and is no longer a fast-moving playground for amateurs but is dominated by some of the world's largest companies. The market opportunity, ie the addressable player base, has ballooned in parallel.

Digitalisation: There have been a number of important changes to the games business model, particularly in relation to the move from physical content to digital distribution (squeezing the retailers: HMV, GameStop and Game Digital). Digitalisation has significantly reduced the financial resources and capital intensity required to launch a new title, as well as offering the opportunity to manage a game's community post-launch, offering downloadable content to sustain a game, increase LTV and maximise recurring revenues.

Together, this has allowed greater business model diversity, more flexibility and better profitability.

Professional management: This latest wave of games businesses are companies with an established track record, run by professional management teams; creative, but non-commercial management teams are not at the helm of the multi-studio businesses.

UK government support: The UK government's decision to foster and support games with the launch of Video Games Tax Relief (VGTR) in April 2014 is a critical success factor. Not only does it recognise video games alongside film and TV as a core creative industry, critical to the UK's future competitiveness, but it also rebalances the cost of operating in the UK, allowing the domestic industry to compete on an equal footing with, for example, Canada, France, the US and Ireland, and other regions with significant industry tax breaks.

Nevertheless, **the games industry remains a risky, hit-based business**. The formula for success is hard to pin down and few companies achieve serial 'hits'; larger companies prefer to acquire proven IP and franchise successful titles than develop new hits themselves. The dynamic nature of the sector, where technology and creativity collide, means that volatility is inevitable (eg Starbreeze with *The Witcher IV* and Bethesda with *Fallout 76*). The shift to recurring revenue models may help ease this, but it will never completely go away.

Other factors to consider

Positives

- Publishers no longer own the route to market.
- Retailers are being disintermediated (although there is still a distribution toll to pay).
- Upfront inventory risk and cost is disappearing with physical product.
- Power has shifted towards the IP owners and developers.
- With diverse business models, there are games to suit every market.

Negatives

- The hit-based business model persists, although it is not the only model.
- The retail channel remains crowded – there has never been more high-quality content.

Take care not to generalise

The UK games sector has essentially re-emerged over the past 18 months, so it is tempting to consider an investment in the 'UK games sector'. However, we would highlight that this tier 1 analysis is not sufficient in itself; the five UK-quoted businesses (six if you include Game Digital), differ significantly in terms of risk profile and investors need to consider carefully which is likely to match their investment criteria most closely.

Each company operates a different business model, with exposure to different markets, and should not be considered as equal alternatives for exposure to a homogeneous sector:

- **Keywords Studios:** a large and diverse supplier of outsourced services to the games industry, offering diversified exposure to the global market, with attractive secular growth augmented by a proven model of integrating bolt-on M&A (see Edison's latest research on KWS).

- **Frontier Developments:** an established self-publisher of AAA games titles, with an expanding portfolio of in-house IP and franchise titles (sticky, community-centric games) and a proven track record on the public markets. It is partnered with Tencent to target the Chinese market.
- **Sumo Group:** a games co-developer, working on leading titles from the global video games majors (publishers), with a secure and visible pipeline of future deal flow, the intention to self-publish its own IP and expand its capabilities via bolt-on M&A.
- **Team17:** develops and publishes 'indie games', from small independent development teams around the world. These are low-cost titles, meaning that Team17 can offer a growing and diversified portfolio of IP cost-effectively, with risk managed via a capital-lite model.
- **Codemasters:** an established developer and publisher of AAA racing games, with a portfolio of established titles as well as new IP in its specialist niche. It has a close relationship with F1, its licensor. It is partnered with NetEase to target the Chinese market.
- **Game Digital:** rapidly evolving its business model to reduce reliance on physical game sales, offering games merchandising, eSports and experiential gaming as part of a growth strategy focused around gaming arenas. It has partnered with Sports Direct to innovate and reinvigorate its offering (see Edison's latest outlook note).

To add to this list, companies that offer exposure to different elements of VR such as VR Education, EVR Holdings and Immotion Group should also be considered, and one of Mercia Technologies' main portfolio holdings is a leading games VR developer, nDreams (see Edison's Mercia initiation note).

Valuations

What investors should expect in 2019

We feel that it would be useful to the more generalist investor to try to highlight leading indicators for the sector.

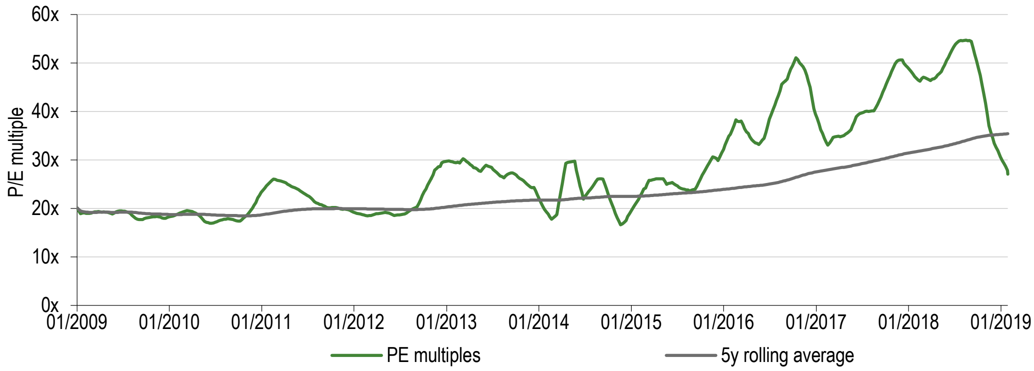
Losing its gloss, or just overbought in H118?

The stock performance of the sector over the course of 2018 was an amplification of the bull H1/bear H2 of the overall market, following the valuations of the FAANGs (Facebook, Apple, Amazon, Netflix and Google) and the broader technology sector both up and then down.

The market became enthralled by *Fortnite* in H218, both the scale of its success and its potential collateral damage to competitors in the sector. As a consequence, there appears to have been some differentiation between stocks, particularly those that might suffer in a battle with *Fortnite*. Although they have sold well, a number of EA titles are seen to have underperformed against expectations (*Battlefield V*, *FIFA 2019*) exposing EA, at least in the short term, with a narrow portfolio of tiring franchises with little new or exciting to lift sentiment on the horizon. Activision Blizzard introduced a battle royale format to its lead FPS, *Call of Duty*, with the release of another of its titles, *Destiny 2*, delayed. Bethesda has also suffered at *Fortnite*'s sword, with *Fallout 76* receiving poor reviews (Metacritic: 49–53) and consequently even worse sales.

What should investors make of this – is this just a correction following a bout of over-optimism in H118 or is there something more fundamental going on?

Exhibit 13: 10-year blended P/E for a basket of leading global games companies



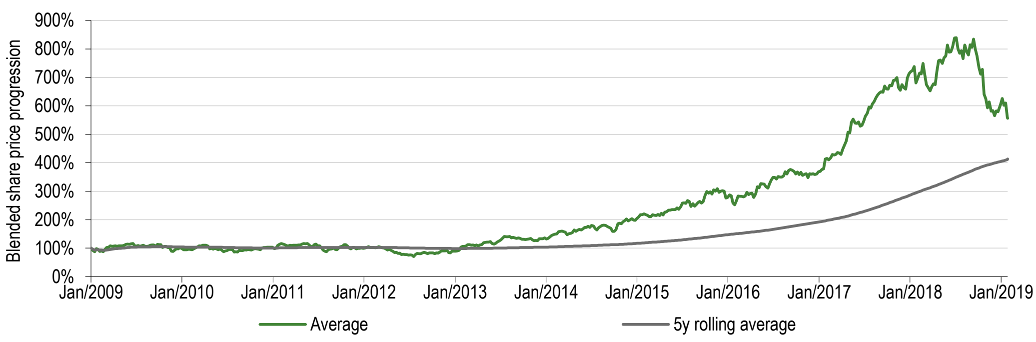
Source: Refinitiv data 22 February 2019, Edison Investment Research

With valuations remaining high (by historical levels) and still at or around the five-year average, our belief is that investors are reassessing the defensive characteristics of the sector and its potential to outperform further in the short term. However, recognising that there have been no fundamental changes to the games sector, even if the growth forecasts for mobile need to be revisited, we believe that investor appetite for the medium to long term should return.

Share prices pared back to levels seen in 2017

Share prices of the more established global games companies have pulled back significantly over the past six months, but this has been a mere dent in the valuation premium such that valuations are now more on par with the five-year average, with share prices rebased to the levels of H117. Nevertheless, despite these lower prices, the big picture remains that, across the board, share prices are multiples of their levels at the start of 2015 and have risen, in aggregate, by close to 600% over the past 10 years.

Exhibit 14: 10-year blended share price progression for a global basket of games companies



Source: Refinitiv data 22 February 2019, Edison Investment Research

It is also instructive to look at other valuation multiples, and below we show similar charts showing the progression of EV/EBITDA and EV/sales for our basket of games stocks. EV/EBITDA has risen from 6–8x at the start of 2009 to 20–25x today, with the sales multiple rising from 1–2x between 2009–14 to closer to 5x today.

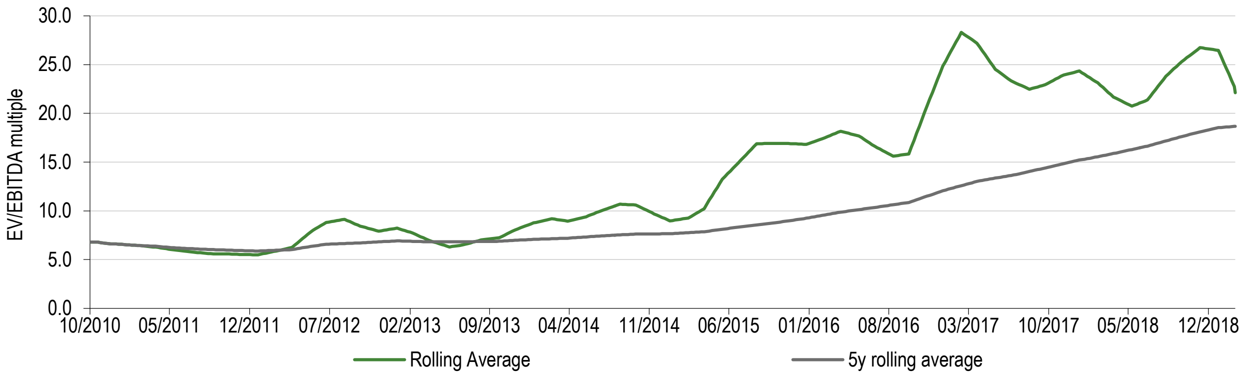
On the face of it, this multiple growth, particularly over the past five years, appears very aggressive. Yet the P/E multiples reflect a slightly different story, where the prevailing multiple from 2009–14 was 20–25x and now (following the recent share price falls) is close to 30x; far more subdued growth and a far less aggressive metric.

How should we explain this? In part, it reflects the growing up of the industry with more robust and better-managed businesses generating greater underlying profit per unit of sale. There is also an element related to the transformation of the industry from delivering physical product to retailers to digital self-publishing with the margin expansion this has allowed.

However, this does not fully explain why the EBITDA trend has closely mirrored the sales trend, suggesting that this is not about gross margins. Instead, the underlying profit has increased substantially despite slower growth in EBITDA and operating profit.

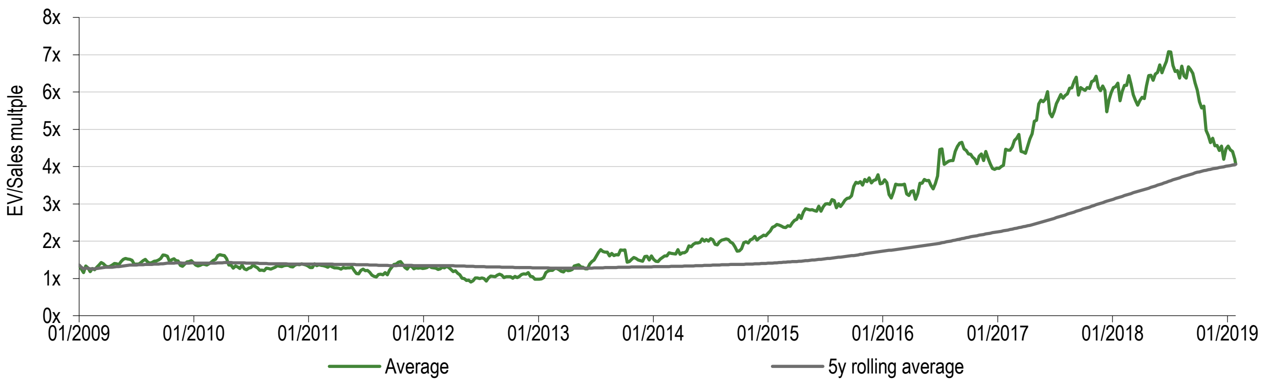
As well as the digital transformation of the industry, reduced levels of tax are certainly part of the equation, with tax breaks around the western world (Canada, US, Ireland, UK, France, etc) helping to support the profitability of the games industry, the growth it generates and the jobs it offers.

Exhibit 15: 10-year blended EV/EBITDA for a basket of global games companies



Source: Refinitiv data 22 February 2019, Edison Investment Research

Exhibit 16: 10-year blended EV/sales for a basket of global games companies



Source: Refinitiv data 22 February 2019, Edison Investment Research

Exhibit 17: Games sector valuations

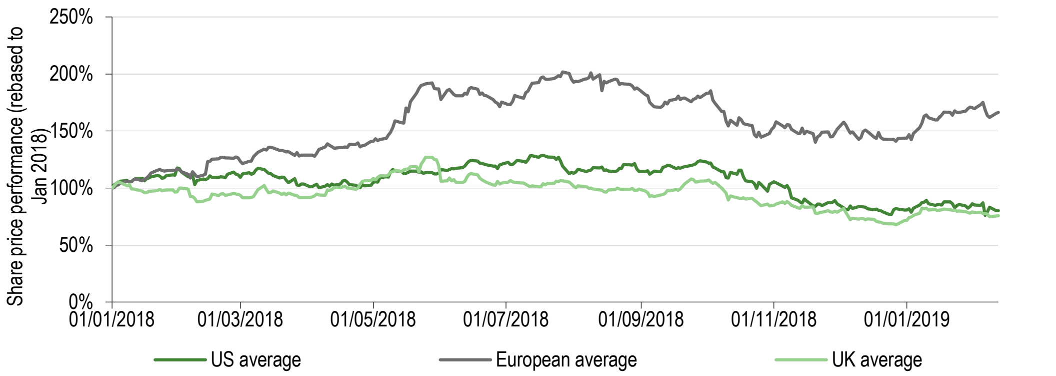
	Name	Year end	Share price (ccy value)	Quoted currency	Market cap (m)	Market cap ($m)	EV ($m)	EV/Sales 1FY (x)	EV/Sales 2FY (x)	EV/EBITDA 1FY (x)	EV/EBITDA 2FY (x)	EV/EBIT 1FY (x)	EV/EBIT 2FY (x)	P/E 1FY (x)	P/E 2FY (x)	Div yield 1FY (%)
UK Games																
CDM.LN	Codemasters Group Holdings	31/03/2019	197.5	GBp	277	361	338	3.6	3.2	15.6	14.1	18.9	14.4	17.4	15.7	0.0
FDEV.LN	Frontier Developments	31/05/2019	872.0	GBp	338	441	389	3.6	4.4	11.2	13.5	16.6	26.9	21.4	38.0	0.0
TM17.LN	Team17 Group	31/12/2018	200.0	GBp	263	343	325	6.2	5.6	16.9	15.6	19.2	17.9	25.4	23.0	0.0
SUMO.LN	Sumo Group	31/12/2018	133.0	GBp	200	260	252	5.3	4.0	18.9	14.0	21.2	16.1	27.3	21.1	0.0
KWS.LN	Keywords Studios	31/12/2018	1154.0	GBp	739	964	965	3.4	2.9	19.7	16.5	23.9	19.4	28.9	23.9	0.1
							Mean	4.4	4.0	16.4	14.7	20.0	18.9	24.1	24.3	0.0
							Median	3.6	4.0	16.9	14.1	19.2	17.9	25.4	23.0	0.0
US/European Games																
ATVI.O	Activision Blizzard Inc	31/12/2019	41.5	USD	31,667	31,667	30,113	4.7	4.2	13.2	11.4	14.1	12.1	18.8	16.1	0.9
EA.O	Electronic Arts Inc	31/03/2019	95.9	USD	28,737	28,737	24,570	5.1	4.9	16.0	14.8	17.6	16.0	24.5	22.1	0.0
TTWO.OQ	Take-Two Interactive	31/03/2019	87.1	USD	9,853	9,853	8,252	2.8	3.0	11.5	10.8	12.4	11.6	18.1	17.5	0.0
UBIP.PA	Ubisoft Entertainment SA	31/03/2019	66.0	EUR	7,349	8,335	8,631	3.7	3.4	7.2	6.5	17.5	14.8	22.0	20.1	0.0
THQNb.ST	THQ Nordic AB	31/12/2019	192.0	SEK	15,763	1,687	1,588	2.6	2.4	8.3	7.0	16.2	13.1	24.8	20.1	0.0
PDXI.ST	Paradox Interactive AB (publ)	31/12/2019	149.8	SEK	15,770	1,688	1,658	11.0	9.2	18.4	14.9	26.0	22.0	33.8	28.7	0.9
SFRG.ST	Stillfront Group AB (publ)	31/12/2019	161.2	SEK	3,865	414	451	2.5	2.2	7.0	5.9	9.3	7.7	14.3	11.6	2.5
CDR.WA	CD Projekt SA	31/12/2018	178.3	PLN	17,147	4,482	4,325	n/r	7.5	n/r	9.6	n/r	10.5	n/r	13.6	0.0
PLWP.WA	Playway SA	31/12/2018	155.0	PLN	1,024	268	255	12.7	8.7	20.8	12.8	20.8	12.9	28.0	18.5	1.5
							Mean	5.6	5.1	12.8	10.4	16.7	13.4	23.1	18.7	0.6
							Median	4.2	4.2	12.4	10.8	16.8	12.9	23.3	18.5	0.0
Mobile/Casual																
ZNGA.O	Zynga	31/12/2019	5.0	USD	4,335	4,335	3,854	2.8	2.5	15.7	12.0	17.9	13.9	23.8	18.5	0.0
GLUU.O	Glu Mobile	31/12/2019	9.0	USD	1,282	1,282	1,184	2.7	2.3	20.4	14.4	21.5	15.0	25.6	18.1	n/a
ROVIO.HE	Rovio Entertainment	31/12/2019	5.3	EUR	422	478	341	1.0	0.9	5.6	4.6	7.1	5.3	12.7	9.7	1.7
MAGIN.ST	MAG Interactive (publ)	31/08/2019	12.2	SEK	320	34	13	0.7	0.6	5.8	2.8	n/r	6.1	n/r	21.8	0.0
							Mean	1.8	1.6	11.9	8.5	15.5	10.1	20.7	17.0	0.6
							Median	1.8	1.6	10.8	8.3	17.9	10.0	23.8	18.3	0.0

Source: Refinitiv data, Edison Investment Research. Note: Prices as at 22 February 2019.

The UK has closely followed US valuation trends, with a relatively strong H118 being followed by a far softer H218, with companies handing back many of their share price gains following recent IPOs. However, in the context of the broader pullback in technology valuations as well as some of the poor performance of recent IPOs, as a group, the UK games companies have performed satisfactorily, with each achieving (or formally stating that they will achieve) their first FY forecasts post-IPO.

European games companies have proved far more resilient in the face of these global headwinds, outperforming strongly in H118 and holding onto many of these gains over the course of H218.

Exhibit 18: How share prices have performed by region over the course of 2018



Source: Refinitiv data 22 February 2019, Edison Investment Research

We remain positive about the prospects for the UK sector in 2019, although we would highlight that the ratings and growth expectations for some of the more mature players remain challenging.

However, our thesis remains that rather than seeking exposure to the ‘games sector’, investors should look harder to understand which of the different business models on offer best matches their risk appetite and approach.

Investment considerations

In conclusion, games development in the UK is in good health with the UK remaining one of the most important markets in the global video games industry; in 2018, the UK was the sixth largest games market in the world with $4.5bn spent and 37.3 million people playing (Newzoo).

Reasons to invest in games companies include:

- Strong growth forecast >10% to 2021 (Newzoo)
- The sector offers exposure to a global youth demographic
- Games is a sector where the UK leads the world
  - The creative industries are well supported by the UK government
- Businesses are more robust than in the early 2000s, with stronger management, flexible cost bases and more diversified revenue profiles
  - Digital distribution allows greater reach and more flexible business models
  - With better management teams, the large developers are all operating profitably
- Advances in technology will only make games content more compelling
- Multiple avenues for future growth, including VR, AR, GaaS and eSports

With multiple IPOs over the past 15 months, there is now a meaningful choice of UK-listed games investments to suit investors with different preferences and risk appetites.

Company snapshots

We highlight below some of the key trends that are likely to drive the games sector over 2019 and beyond and have provided our views on which of the UK-based games companies offers exposure to each of these separate trends.

As we look forward to 2019 and beyond, what sorts of companies do we think will do well and which do we think might struggle?

What sorts of company will do well?

- Well-funded global majors
- Niche companies that understand and serve their player base
- Companies that build and nurture community-centric games
- Companies with a broad exposure to the fast growth of mobile
- Broad-based international service companies/outsourcers with a high-quality client base
- Opportunistic, selective acquirers

Which companies might suffer?

- Companies exposed to a single IP or narrow portfolio
- Companies with inadequate financial resources
- Companies looking for mobile 'hits'
- Mid-market publishers
- WFH developers forced to take on low-quality, marginal projects
- Over-extended 'buy and build' outfits

Exhibit 19: Analysis of UK games company comparative advantage

	Keywords	Sumo Digital	Team17	Frontier Developments	Codemasters
Market cap (£m)	739	200	263	338	277
Premium/(discount) to IPO price	838%	33%	21%	587%	-1%
Concensus P/E (FY1)	28.9x	27.3x	25.4x	21.4x	17.4x
Liquidity					
Public market track record					
Inorganic growth exposure					
Revenue visibility					
Mobile exposure					
eSports exposure					
Asian/Chinese exposure					
VR exposure					
Digital exposure					
VGTR exposure					
IP ownership					
Diversification					
Potential for upside surprise					

Source: Company data, Refinitiv, Edison Investment Research. Note: Full green circle denotes company with maximum exposure. Full grey circle denotes company with minimum exposure. Prices as at 22 February 2019.

Exhibit 20: UK games company snapshots

Keywords Studios

Company	Description	Key financials	Investment case
KWS.LN **1154p**	**Corporate overview** Keywords is the leading international creative and technical services provider to the global video games industry. Established in Dublin in 1998, it has more than 50 facilities in 20 countries strategically located in Asia, the Americas and Europe. Keywords provides integrated art creation, software engineering, testing, localisation, audio and customer care services across more than 50 languages and 16 games platforms to a blue-chip client base of approximately 650 clients across the globe. Keywords continues to build world-leading capabilities in services that video game and similar interactive content creators need. Keywords has a strong market position, providing services to 23 of the top 25 most prominent games companies, including Activision Blizzard, Bandai Namco, Bethesda, Electronic Arts, Konami, Riot Games, Sony, Square Enix, Supercell, TakeTwo, Epic Games and Ubisoft. Recent titles worked on include *Uncharted 4: A Thief's End*, *Call of Duty: WWII*, *Mortal Combat X*, *Assassin's Creed Origins*, *Battlefield 1*, *League of Legends*, *Fortnite*, *Clash Royale* and *Rainbow Six Siege*. **Catalysts:** FY results 8 April 2019	Dec 2017a Mkt cap: £739m Net debt: -€2.8m Revenue: €151m EBITDA: €26.6m Net profit: €7.3m	**Bull** ■ Leading global games services company. ■ Strong management team with a proven track record of strong growth, both organic and M&A. ■ Offers diversified exposure to the growth of the global games market. ■ Weak sterling a benefit to euro reporting. **Bear** ■ Concerns over sustainability of growth trajectory. ■ Model requires continuing availability of M&A opportunities at attractive prices.

Codemasters

Company	Description	Key financials	Investment case
CDM.LN **197.5p**	**Corporate overview** Codemasters is a video game developer and publisher, specialising in high-quality racing games. The company is one of the most recognised British game developers and publishers, with a 30-year track record of producing successful games. The group has approximately 500 full-time employees and operates in three UK locations – Southam (Warwickshire), Birmingham and Runcorn (Cheshire). It also has one overseas location in Kuala Lumpur, which is an art production facility. Codemasters has a proven track record of video games technology, development and innovation spanning three decades of rapid technological change. It has exploited its technology to develop innovative video games across a wide variety of different platforms, and has established relationships with globally renowned partners including Apple, Microsoft and Sony. The group currently manages three established franchises in the racing games category, being DiRT, GRID and F1, and launched ONRUSH 2, its fourth franchise, in June 2018 with a view to extending its penetration of the racing games category. **Catalysts:** FY results June 2019	Mar 2018a Mkt cap: £277m Net debt: -£17m Revenue: £64m EBITDA: £12m Net profit: £0.9m	**Bull** ■ Global leader in racing game niche, a distinct sector with genuine global relevance. ■ IP owner and licensor – strong relationship with F1. ■ Partnership agreement with Netease to target Chinese mobile market. ■ Partnership agreement with Motorsport Network to target eSports opportunity ■ Has reconfirmed FY19 forecasts. **Bear** ■ Narrow portfolio of titles. ■ Higher-risk model with significant working capital requirement to satisfy boxed as well as digital sales. ■ F1 licence renewal on the horizon.

Frontier Developments

Company	Description	Key financials	Investment case
FDEV.LN **872p**	**Corporate overview** Frontier is a world-class video game developer and publisher, with multiple revenue-generating franchises. It is focused on video game development across a wide variety of genres and platforms, with a proven track record of progressive development and innovation spanning several decades of rapid technological change. The business has more than 400 full-time employees and is headquartered in Cambridge, UK. Frontier has established relationships with globally renowned partners, producing work for international brands as well as its own IP. Frontier develops games across multiple platforms using its proprietary cross-platform technology, Cobra. It self-publishes, and has achieved commercial and critical success with BAFTA-nominated titles, *Elite Dangerous* and *Planet Coaster*, as well as its most recent licensed title, *Jurassic World Evolution*. **Catalysts:** Trading statement July 2019, FY results Sept 2019	May 2018a Mkt cap: £338m Net debt: -£24m Revenue: £34m EBITDA: £9m Net profit: £3.6m	**Bull** ■ Strong management team with a proven public market track record. ■ Digitally focused business model – allows a lean development process, with LTV managed through DLC. ■ Reduced revenue share with Epic/Steam offers material benefit to bottom line. ■ Focused on 'sticky' community-centric games. ■ Tencent partnership has potential to deliver material incremental sales in China. **Bear** ■ Relatively narrow games portfolio. ■ Ambitious release pipeline. ■ Cost of licenced IP unclear.

Sumo Group

Company	Description	Key financials	Investment case
SUMO.LN **133p**	**Corporate overview** Sumo Digital is one of the UK's largest independent developers of AAA-rated video games, providing both turnkey and co-development solutions to an international blue-chip client base. Atomhawk, a complementary business acquired in June 2017, is a multi-award-winning visual design company, servicing the games, film and visual effects industries. The group delivers full-service visual and development solutions, which include initial concepts and pre-production, production and development, and post-release support. Latest development projects include *Hitman 2* (published by Warner Brothers) November 2018, *Crackdown*, with a launch date of February 2019 and *Team Sonic Racing* to be launched May 2019. Projects underway with Microsoft including new Xbox hardware and game streaming. **Catalysts:** FY results 9 April 2019	Dec 2017a Mkt cap: £200m Net debt: -£12.4m Revenue: £30.6m EBITDA: £8.4m Net profit: -£21.3m	**Bull** ■ Safe and steady model with profit guaranteed whether releases are 'hits' or not. ■ 12- to 18-month visibility over future revenue pipeline. ■ Benefits from DLC and lifetime game management services. ■ IP ownership an increasing focus. ■ Substantial beneficiary of VGTR regime. **Bear** ■ Cost+ people business. ■ Potential Brexit risk to future recruitment.

Team17

Company	Description	Key financials	Investment case
TM17.LN **263p**	**Corporate overview** Team17 is a leading video games label and creative partner for independent ('indie') developers. The group supports both owned first-party IP and third-party IP– through partnering with indie developers globally – in the development and publishing of games across multiple platforms, typically for a fixed revenue share. The group focuses on premium, rather than free-to-play games, and its portfolio comprises over 90 games, including the iconic and well-established *Worms* franchise, as well as *Overcooked* and *The Escapists*. Established in 1990, Team17 collaborates with fellow developers around the globe sharing its expertise from creation to launch across PC, console and mobile devices. 88% of the group's revenues are generated from digital sales, which facilitates a high level of control over pricing and game lifecycle management, with minimal additional development costs post launch. Due to the group's diverse portfolio of owned and third-party IP, coupled with its approach to lifecycle management, revenue from titles released in previous years accounted for 53% of 2017 revenue. In addition, a material proportion of new releases are from existing franchises, accounting for 25% of 2017 revenue. **Catalysts:** FY results 19 March 2019	Dec 2017a Mkt cap: £263m Net debt:- £13m Revenue: £30m EBITDA: £5m Net profit: £4.4m	**Bull** ■ Broad portfolio of owned and third-party IP. ■ Digitally focused business model with 88% of revenues generated from digital sales. ■ Reduced revenue share with Epic/Steam offers material benefit to bottom line. ■ Meaningful multi-year revenue generated from extensive back catalogue. **Bear** ■ Small portfolio of key titles. ■ Crowded market segment. ■ Relatively minor benefit from VGTR.

Source: Company websites, Refinitiv data, Edison Investment Research. Note: Prices as at 22 February 2019.

Appendix a

Exhibit 21: Game genres/categorisation (with example titles)

Action/adventure Assassin's Creed, Tomb Raider, God of War Assassin's Creed	**eSports (competitive gaming)** League of Legends, Overwatch, Counter-Strike, Starcraft Overwatch on Twitch	**First person shooters (FPS)** Fortnite, Overwatch, Call of Duty 4, Battlefield V Fortnite - Battle Royale
Indie (lower budget titles published by independent developers) Worms, The Escapists 2, Overcooked, Cave Story, Inside, Limbo Overcooked 2	**Massively multiplayer online (MMO)** World of Warcraft, The Elder Scrolls Online, Final Fantasy XIV World of Warcraft	**Open World/Sandbox (freedom to roam, and interact with, the virtual world)** Elite Dangerous, Red Dead Redemption 2, Hitman, EVE Online, Minecraft, Grand Theft Auto Hitman: Episode 5, Colorado
Platform LostWinds, Donkey Kong, Super Meat Boy, Planet Alpha LostWinds 2	**Puzzle** Candy Crush, Tetris, Pac-Man, Snake Pass, Angry Birds Candy Crush Saga Friends	**Racing** F1 2018; Super Mario-Kart, Onrush, Forza Motorsport F1 2018
Role-playing games (RPG) The Witcher, Pillars of Eternity 2, Tyranny The Witcher 3	**Real time strategy (RTS)** Total War, Starcraft, Age of Empires, Stronghold, Hearts of Iron IV Hearts of Iron IV	**Simulation (Sim)** Planet Coaster, Jurassic World Evolution, The Sims, Flight Sim Planet Coaster
Sports FIFA 19, Madden 19, Football Manager 2019 FIFA 19	**Virtual/augmented reality (VR/AR)** Fruity Shooty, Pokemon GO, Beat Saber, Transference Fruity Shooty	**Battle Royale** Battle Royale

Source: Edison Investment Research, corporate websites

Appendix b

Exhibit 22: Major games events in 2019

18–22 March 2019 San Francisco, US	**GDC 2019** The world's largest professional games industry event. GDC brings together 28,000 attendees to exchange ideas and shape the future of the industry with five days of education, inspiration, and networking at the Moscone Convention Center in SF. Attendees include programmers, artists, producers, game designers, audio professionals, business decision-makers and others involved in the development of interactive games and immersive experiences. https://gdconf.com
28–30 May 2019 Queen Elizabeth II Centre, London	**Casual Connect Europe** Learn from over 100 leaders in established and emerging markets of the games industry – covering game design, eSports, social casino, funding, next-generation technology and best practices. europe.casualconnect.org/
2–14 April 2019 London, United Kingdom	**London Games Festival** A city-wide celebration of video games, encompassing a myriad of events such as the LGF Hub, Now Play This and Ensemble exhibitions, Games Finance Markets and a games character cosplay parade games.london
11–13 June 2019 Los Angeles, California	**E3 2019** The world's biggest video games event returns to LA. Expect big announcements from the likes of EA, Nintendo and Xbox, plus the chance to play the next generation of major titles. https://e3expo.com/
9–11 July 2019 Brighton, UK	**Develop:Brighton** Develop:Brighton has been bringing together the European Game Dev community from global superstars to micro indies since 2006. Hear from the industry's leading lights, get up-to-date with the latest tools, techniques and industry trends, plus network with over 2,000 game dev professionals. https://developconference.com/
20–24 August 2019 Cologne, Germany	**Gamescom 2019** The biggest B2B video games show in the world, and also the biggest consumer games show on the planet. Featuring big games and hundreds of companies of all different sizes. gamescom.global/
17–20 October 2019 ExCel Centre, London	**EGX** EGX returns to London after four years in Birmingham. The leading consumer show will feature all the biggest games coming to market, plus a series of industry events. https://www.egx.net/egx
24–26 October 2019 Abu Dhabi National Exhibition Center, Abu Dhabi, UAE	**Middle East Games Con** Middle East Games Con will return for its third edition, after doubling in size in just two years, with 18,000 visitors and 30 speakers. 2019 will bring the consumer, B2B and conferences all under one roof for three days in the capital of the United Arab Emirates. https://me-gamescon.com/en/homepage.html

Source: Edison Investment Research, corporate websites

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