

All the world's a game

Video games will be the fastest-growing and most exciting form of mass media over the coming decade, says Tim Cross

IN NOVEMBER 2010 "Call of Duty: Black Ops" was released. Fans in many countries queued round the block to get their hands on a coveted early copy. A lucky few had won tickets to invitation-only release parties which were broadcast live to viewers across the internet. The event had been advertised on billboards, buses and television for weeks. Chrysler even produced a commemorative version of its Jeep. In the event the reviews were mixed, but no matter: the publishers, Activision, notched up worldwide sales of \$650m in the first five days. That made it the most successful launch of an entertainment product ever, and people kept buying. A month later the total stood at over \$1 billion.

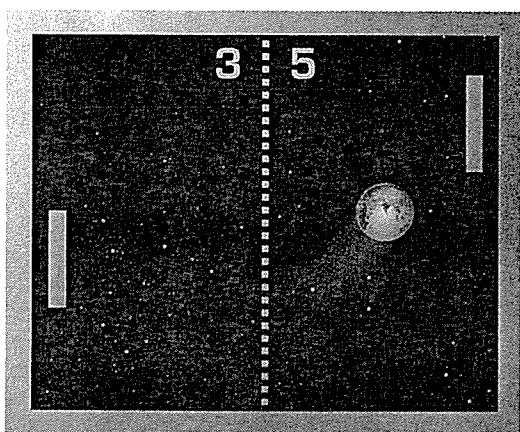
"Black Ops" is not a film or a book: it is a video game. For comparison, "Harry Potter and the Deathly Hallows Part 2", the current record-holder for the fastest-selling film at the box office, clocked up just \$169m of ticket sales on its first weekend. "Black Ops" stole the crown from its predecessor in 2009, "Call of Duty: Modern Warfare 2". The latest instalment, "Modern Warfare 3", released on November 8th, set a record of its own with \$750m in its first five days.

Over the past two decades the video-games business has gone from a cottage industry selling to a few niche customers to a fully grown branch of the entertainment industry.

According to PricewaterhouseCoopers (PwC), a consulting firm, the global video-game market was worth around \$56 billion last year. That is more than twice the size of the recorded-music industry, nearly a quarter more than the magazine business and about three-fifths the size of the film industry, counting DVD sales as well as box-office receipts (see chart below). PwC predicts that video games will be the fastest-growing form of media over the next few years, with sales rising to \$82 billion by 2015.

So who plays? The stereotypical image of the gamer—teenaged, male and probably rather nerdy—has hardly changed in 20 years. But it is no longer accurate, if it ever was. Today the average age of players in America, the biggest market, is 37, and 42% of them are female, according to the Entertainment Software Association (ESA), an American trade group. Some 72% of households in America play games of some sort, says the ESA. Even among the over-50s the share is one in three.

One explanation for this coming of age is demography. The first video-gaming generation, which grew up with games arcades and home consoles, is now entering middle age. It seemed likely that some of those who whiled away their youth playing "Space Invaders" and "Galaxian" would stick to their hobby into adulthood. But games companies, readier than other media to chase the "next big thing", have also started looking for new audiences. In recent years they have drawn in ▶



ACKNOWLEDGMENTS

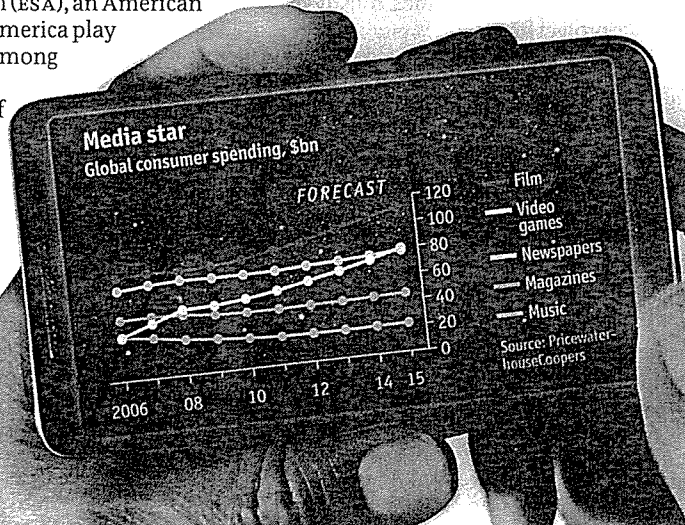
Besides those quoted in the text, many others contributed ideas, insights, contacts and suggestions to this special report, including Justin Brown, Jonnie Bryant, Edward Castranova, Sara de Freitas, Katie Goldberg, Vikas Gupta, Aubrey Hesselgren, Tim Luft, Peter Moore, Mike Morhaime, Robert Pike, Nicholas Plott, J.P. Rangaswami, Daniel Stemkoski, John Walker and Nick Yee. Others spoke on condition of anonymity. The author would like to thank them all.

A list of sources is at
Economist.com/specialreports

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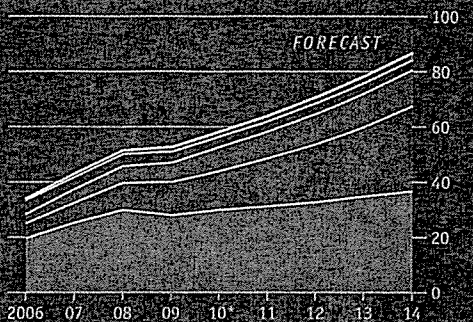
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Shoot 'em up

Global video-games revenue, \$bn

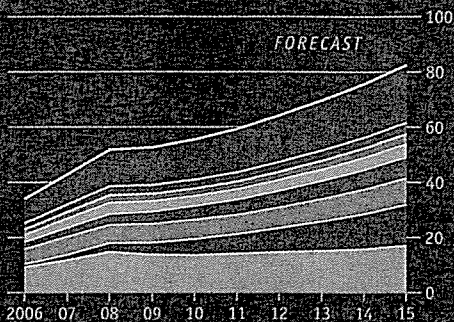
Console Online Mobile
PC In-game advertising



Sources: Digi-Capital; PricewaterhouseCoopers

Video games, market size, \$bn

US China Japan South Korea
Britain Germany France Others



Estimate

US gamers by gender:

58% 42%



Average age of US gamer:

37

► groups such as women, the elderly and middle-aged commuters who would never describe themselves as gamers but are more than happy to play "Farm Ville" on Facebook or "Angry Birds" on their smartphones.

The biggest market is America, whose consumers this year are expected to spend \$14.1 billion on games, mostly on the console variety written for Microsoft's Xbox 360, Sony's PlayStation 3 or Nintendo's Wii. Consoles also dominate in Britain, the fifth-largest gaming market. In other parts of Europe, and particularly Germany, PC games are more popular, says Peter Moore, chief operating officer of Electronic Arts, a big games publisher. "German parents tend to see console games as childish, but they think PCs have some education value," he notes.

China is already the second-biggest market and one of the fastest-growing, with sales rising by 20% last year. The high price of consoles and rampant piracy have encouraged the development of online games, mostly played on PCs, which are easier to protect from pirates.

Japan is a law unto itself. It was the second-biggest market until China overtook it earlier this year, but the Japanese idea of fun is different from other people's. Western games that sell well elsewhere tend to struggle there, says Mr Moore, and the same is true of Japanese games in the West. Nobody really knows why. In high-tech South Korea, the fourth-largest market, PCs and online games are also popular, not least because of lingering resentment of Japanese products.

The PlayStation generation

If you had to pinpoint the moment when gaming started to move from niche to mainstream, December 3rd 1994 would be a good date to pick. That was when Sony, a Japanese consumer-electronics giant, launched its PlayStation console. Until then games-console companies, led by Sega and Nintendo, had con-

centrated largely on children and teenagers. Their best-known products featured the adventures of pixelated Italian plumbers and cute cartoon hedgehogs. But the PlayStation's neat design, slick marketing and line-up of big-budget games appealed to young men in their 20s and 30s, says Piers Harding-Rolls of Screen Digest, a firm of media analysts.

Another big event was the launch of Nintendo's Wii console in 2006. This was specifically aimed at women, families and those who had never played video games before. Its user-friendly, simple design, intuitive motion-sensitive controller and light-hearted games based on fitness, sports and the sorts of puzzles found on the back pages of newspapers helped it sell 89m units, half as many again as PlayStation 3 or Xbox 360.

Now the ever-increasing computing power of mobile phones has put the means of playing games into the pockets of people who would never think of spending hundreds of dollars on a dedicated console or a PC. The simple games that came pre-loaded onto the mobile handsets of a decade ago have evolved into a subset of the industry in its own right, appealing to a more casual crowd who play them on trains, in airport departure lounges or while waiting for the washing to finish. Today's smartphones pack far more computing power than the original PlayStation, and games are a big part of their appeal: the two most popular kinds of software on Apple's App Store are games and entertainment.

The internet has played a crucial part in the rise of video games, enabling developers to get their products into their customers' hands without the need for traditional shops or publishers. That has allowed small, independent developers to compete with the big firms who might spend tens of millions of dollars on developing a single title and as much again on marketing it. As a result the industry is becoming increasingly fragmented as its markets become more differentiated.

► The internet has also become a games platform in its own right, making the hobby truly sociable by electronically linking gamers the world over. Millions of people spend many hours each week playing and working (sometimes the distinction is not clear) in virtual places such as “World of Warcraft” and “EVE Online”. Hundreds of millions more play free, simple, sociable games on Facebook, such as “Lexulous”, which is a bit like Scrabble, and “FarmVille”, a game with an agricultural setting. Increasingly the games themselves are free, but the virtual goods available in these online worlds—a stable for one’s electronic horses, say, or a particularly pretty shirt for one’s digital alter ego to wear—cost real money.

The video-games industry has long been dogged by accusations that violent games breed violent behaviour and that its products can cause addiction. The evidence was never strong in the first place, but the shady reputation has proved hard to shake off. In fact many games do not feature any violence. With the new emphasis on more casual games, some of the most popular titles involve inoffensive pastimes such as constructing electronic cities, completing abstract logic puzzles or managing a virtual football team.

Like all media businesses, the games industry is changing fast. What makes it different from the rest is that it has welcomed change and innovation and thrived on it. It is now growing in all sorts of unexpected ways. For example, the best players can earn money (sometimes a lot of it) from “e-sports”—that is, video games played professionally, in front of a crowd. And after years of talk about an imminent “virtual reality” revolution, it is the games industry that has perfected cheap, convincing simulations of the real world. Technology pioneered by games is now being put to use in fields from military training programmes to molecular biology and virtual showrooms for cars. The industry has even spawned a management technique, “gamification”, that applies the psychological principles of game design to motivating workers and engaging customers.

Yet video games are still widely regarded as trivial. This special report will argue that as the newest and fastest-growing form of mass media they deserve to be taken seriously. ■

As you like it

There is a video game for every taste

VIDEO GAMES COME in many guises. There are strategy, adventure, puzzle, sports and business games, first-person and third-person shooters, fantasy and science-fiction role-playing games, fighting games (think of a virtual boxing match), flight simulators and many, many more. The same people will probably play lots of different kinds of games. The archetypal players—young males with plenty of free time and disposable income—are known as hardcore gamers. They tend to use dedicated consoles or powerful PCs, and their games are likely to involve violent action, complicated role-playing or strategy.

In recent years they have been joined by so-called casual players who spend less time, money and attention on simpler games, often played on mobile phones or

online. Action and strategy titles are available for such users too, but they tend to be less complex. The classical casual genre is puzzle games—abstract brain-teasers such as the venerable “Tetris” or modern titles like “Dr Kawashima’s Brain Training”.

The internet offers more possibilities. “Massively multiplayer” games are played by hundreds or thousands of people simultaneously, all inhabiting the same virtual world, hosted on a remote server. The iconic example is the fantasy-themed “World of Warcraft”. Life in such worlds goes on regardless of whether an individual gamer is playing or not. On a different note, social games mix the community feel of social-networking sites with game-play mechanics, encouraging friends and acquaintances to play together.

The business of gaming

Thinking out of the box

Consoles are no longer the only game in town

THE IDEA BEHIND video games used to be simple. Nintendo, Microsoft, Sony, Sega and others sold consoles at a loss and made their money from the boxed games they produced for them. The punters, mostly young technophile men, bought the games from a shop, played them for a few weeks and then put them away.

Those customers are still around, but they have been joined by a plethora of others. New, more casual sorts of games are being picked up by a mass audience that would previously not have played at all. “In the past few years two things have changed,” says Mr Moore of Electronic Arts. “The first is the proliferation of platforms [on which to play games], and the second is that it’s become so much easier to call yourself a gamer.”

So the industry has branched out into a bewildering variety of sub-sectors and niches. At one extreme, companies in the traditional sector are still charging \$50 or \$60 for high-end console games with ultra-realistic graphics and cinematic game play. At the other, a shoal of smaller firms is developing simpler, more casual games aimed at a much larger and more diverse group of customers. In between, a mix of established firms and start-ups are testing new ways to develop games and new business models for selling them.

One of the biggest changes has been the rise of the mobile phone as a gaming device. Games specifically designed to be played on mobile phones already account for \$8 billion of the \$56 billion global games market, even though they typically sell at less than a tenth the price of a traditional console game. Such mobile games are simpler to play and require less time and dedication than the console titles. Their relatively low development costs and the fact that they can be downloaded over mobile networks brings them into impulse-buy territory, says Mr Harding-Rolls at Screen Digest.

Playing on the move

The potential market is huge. The number of mobile-phone subscriptions worldwide is over 5 billion. Last year 1.6 billion handsets were sold, a 31% rise on 2009. That is attracting attention from big, established firms such as THQ, an American publisher and developer of video games, and Square Enix, a Japanese publisher and developer that has a dedicated mobile division.

But many games for mobile phones are made by small start-ups, attracted by low entry costs. The best-known example is “Angry Birds”, released in 2009 by Rovio Mobile, a Finnish firm with just 55 employees. It is a light-hearted affair in which vengeful player-controlled birds hurl themselves at fortifications built by a group of egg-snatching green pigs. In ►

SPECIAL REPORT

VIDEO GAMES

► terms of sales, it is among the most popular games ever made, with total downloads of more than 500m (the game is available in a free but limited edition as well as in a standard, paid-for version). By contrast, a console game is reckoned to have done well if it sells a couple of million copies.

Games are proving a popular application for mobile phones, and especially for the latest generation of smartphones such as Apple's iPhone. PwC expects the market for such apps to grow from around \$7 billion last year to \$35 billion in 2015, and much of that growth is likely to be driven by games. They accounted for more than half of the 100 most popular apps for the iPhone in 2010 and make up a large chunk of the software market for other brands of smartphone too (see chart 1).

Online orcs

Thanks to the spread of high-speed internet connections, the web has emerged as a games platform in its own right. Blizzard Entertainment's "World of Warcraft", an intricate online fantasy world filled with orcs and dragons, attracts around 9m regular users, each of whom pays a monthly subscription fee of around \$10 to play.

As with mobile games, much of the interest in online gaming revolves around attracting a new, more casual kind of player. Again, the potential market is vast. Companies such as PopCap, a Seattle-based games studio, specialise in easy-going games that run in ordinary web browsers. PopCap's most successful game to date is "Bejeweled", an abstract puzzle game in which users have to create patterns in a grid of coloured gems. It is easy to pick up but difficult to master, and can be played for a few minutes at a time. In 2010 sales of the full version, which sells for about \$20, passed 50m.

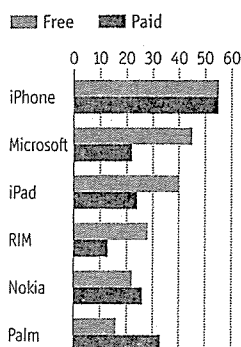
Even more dramatic has been the rise of social-networking sites as venues for video gaming. As with mobile phones, one attraction for developers is the potential size of the audience. Facebook, the biggest, claims 800m users each month, most of whom are fairly new to gaming.

Games make up half of the 40 most popular applications on Facebook. Some are simply electronic takes on existing real-world pastimes, such as "Texas Hold'em", a poker game with 30m users a month, or "Slotomania", a digital version of slot machines (that can be played with or without real money) with 5m devotees. The most popular games command enormous audiences. "CityVille", an urban-planning game and the most popular Facebook game at the moment (though tastes are fickle), attracts 51m users a month. Its San Francisco-based developer, Zynga, specialises in social-networking games. Set up in 2007, it now has 2,000 employees and revenues of around \$850m a year.

One reason why these games are so successful is that they help people do something they are already keen on: keeping up with their friends online.

Fun by phone

Games' share of top 100 apps by platform, 2010, %

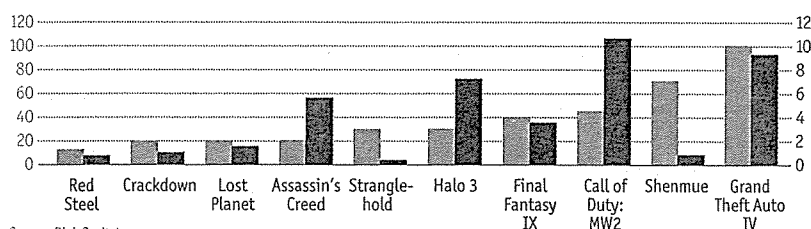


Source: Digi-Capital

Win some, lose some

Estimated development cost, \$m

Unit sales since launch, m



Source: Digi-Capital

In "CityVille", for instance, there are incentives for players to help with the running of other cities managed by their friends. Unlike traditional console games and even many mobile ones, these games do not demand the players' full attention but are designed to be dipped into in short bursts. And they are free to play, at least for users who are prepared to do without frills and extras, which are often bought for real money (see box, next page).

Moreover, the designers are able to collect lots of information on exactly how users are playing the games online and can tweak them to suit the players' latest whims. "You spend single-digit millions, work for six months, put your game out there, study the telemetry to learn very quickly what people like and what they don't, and refine the product from there," says Frank Gibeau, a senior manager at Electronic Arts. By contrast, a typical console game may cost \$20m-30m to make and take several hundred people and two years or more to develop (see chart 2).

For all the promise of the new, more casual games, the console-based ones still account for \$28 billion of the industry's global sales of \$58 billion. But the balance is changing. Sales of console games will be flat at best for the foreseeable future, reckons Tim Merel of Digi-bank, an investment bank that specialises in the games business, whereas mobile and online games will continue to grow rapidly, keeping the industry's overall growth rate above 8% a year. By 2014, reckons Mr Merel, mobile and online gaming will account for half the industry's revenue.

Unpacked

A new generation of consoles, offering better graphics and more internet connectivity, will go on sale from next year, when Nintendo releases the Wii U, the successor to its popular Wii machine. Microsoft and Sony are expected to follow suit in 2013 or 2014 with sequels to their machines. But some analysts now wonder whether dedicated games consoles have much of a long-term future. Michael Pachter of Wedbush Securities reckons that the coming generation of consoles could be the last. For all but the most devoted users paying \$300 for a dedicated machine that takes up space in the living room makes little sense when, for a little more, you can buy a smartphone or a tablet PC that has plenty of other uses as well.

The industry likes to boast that it has become a bit like Hollywood, says Rod Cousens, the boss of Codemasters, a mid-sized British games developer. But at least the big Hollywood studios spread their risk across at least ten films a year, whereas games developers tend to work on one at a time. This is now an expensive, risky and hit-driven business, so the developers have become deeply conservative, preferring to build on past successes rather than try something new. Every one of the ten bestselling console games in America last year was a sequel or a development of an existing franchise.

The console-makers are well aware of this. Nintendo helped to pioneer the idea that games could appeal to a much

► wider audience. Its Wii console has sold 89m units over the half-decade since its launch, outdoing both Sony's PlayStation 3 (56m) and Microsoft's Xbox 360 (58m), largely thanks to a games catalogue aimed at casual fans. It features titles like "Wii Fit" (a fitness game) and "Wii Sports", a version of sports like golf, tennis and ten-pin bowling. The Xbox, PlayStation3 and Wii all have their own online shops that allow consumers to download games directly to their consoles, and all three are encouraging developers to make casual games for them. Mr Merel thinks the console business will remain a smaller though mostly profitable niche within a games industry that will range over a wide vari-

ety of platforms and attract a much more mainstream audience.

Categories such as "casual" or "online" games are not always neat and tidy. Not all online games are aimed at casual users. "Minecraft", developed by Mojang, a tiny Swedish firm, is an online adventure game that mixes the building qualities of Lego with the social appeal of "World of Warcraft". Despite its basic graphics and intricate gameplay it has sold over 4m copies. Conversely, some recent smartphone games have almost console-quality graphics and involving storylines. Development costs are already ticking up. The only safe bet about the future is that it will be more fragmented and more diverse than the past. ■

Paying for pixels

Virtual goods are worth real money—and cause real dilemmas

CASUAL GAMES MAY attract huge audiences, but it is harder to convert those millions of eyeballs staring at screens into hands reaching for wallets. Piers Harding-Rolls at Screen Digest reckons that the 57m or so game consoles in use in America generate about \$7.5 billion of revenue each year, but the 109m players of casual online games produce just \$250m.

Casual-game firms are testing a variety of ways to make more money from their users, from straightforward digital sales to subscriptions and advertising. One promising model comes from East Asia, gaming's spiritual home, where internet access is widely available and piracy is rampant. It involves giving users free access to online games but then charging them for all sorts of extras.

One Western example is "The Lord of the Rings Online", which allows players to live in an online version of J.R.R. Tolkien's fantasy world. When the game was released in 2007, players had to buy the game for \$40 and then pay a subscription for each month they played. Last year Turbine, the game's developers, moved to a new charging model in which the game was made available for nothing but players could spend real-world money on "Turbine Points", a sort of electronic currency with which to buy items that make the player more powerful. Turbine says its revenue from the game tripled.

In "FarmVille", Zynga's wildly popular Facebook-based farming simulator, players can earn coins to spend on crops, livestock or farm equipment by playing the game, or they can buy them with real cash. Such transactions make up the bulk of Zynga's revenues.

Not all virtual goods offer players an in-game advantage. "Vanity items" such as a new design for the electronic homestead are just nice to have. Spending real money on virtual luxuries may seem odd, but a

minority of dedicated players wants to show off to others online, says Nick Lovell of Gamesbrief, a games-business website.

"You make 80% of your revenue from 20% of your player base," he adds. A few of them will shell out eye-watering amounts of money. In Dark Orbit, a browser-based space adventure from Bigpoint, a German online-game studio, customers can buy a "10th drone" to beef up their spaceship for around €1,000. BigPoint has sold more than 2,000 of them this year.

This sort of trade allows players to work out a real-world value for their in-game items (and makes it possible for economists to calculate the GDP of virtual worlds). Some players sell desirable items to other players for real cash, a practice chronicled by Julian Dibbell in his 2006 book, "Play Money", in which he earned up to \$3,000 a month trading in virtual goods. Such reselling is generally forbidden by the games companies, though there are exceptions, including "Second Life", a virtual world run by the American firm Linden Lab. But the players themselves treat their virtual goods as if they were real and can become extremely possessive about them. In 2005 a Chinese player, Qiu Chengwei, killed a fellow-player of "The Legend of Mir 3" for selling (on eBay) a rare virtual sword that Mr Qiu had lent him. He is now serving a life sentence.

All this raises some intriguing questions for governments. Should virtual income be reported to the real-world taxman? China thinks so, in principle at least: it has said it wants to tax its virtual-goods market, thought to be worth around \$1.5 billion a year, although how the tax would work is not clear. The South Korean authorities have ruled that trading in virtual goods should be subject to a 10% sales tax. America's Internal Revenue Service is wrestling with the same problem. And if a games company goes bust, can its players claim

compensation for loss of valuable property? After all, "some players have accumulated wealth worth thousands of dollars in these games," says Eyjolfur Gudmundsson, chief economist at Iceland's CCP Games, which makes the sci-fi trading game EVE Online.

In 2010 South Korea's highest court ruled that, against the wishes of the games companies, players' virtual cash could indeed be converted freely into real-world money, provided it was generated in a game of skill rather than won in a game of chance. It is only a matter of time, says Roxanne Christ, a lawyer at Latham & Watkins, before Western courts will be faced with the same questions.



E-sports

Gentlemen, start your computers

Sport by other means

IN ONE CORNER was Greg Fields, a talented young player whose psychological demons had so far stopped him from realising his full potential. In the other was Lim Yo-Hwan, an old master with a string of titles and championships, still a ferocious competitor, but one whose glory days were probably over. Mr Fields had already racked up a 3-0 lead in their best-of-seven series, but over the next 30 minutes Mr Lim put on a dazzling display of calculated risk-taking and exquisite control and won the next game, then another and another, levelling the series at three games apiece.

The game being played was "StarCraft 2", a strategy game designed by Blizzard Entertainment, an American developer, featuring three clashing science-fiction armies. The matches were part of a three-day tournament run in Orlando, Florida, by Major League Gaming (MLG), an American firm that organises "e-sports" events around the country. Besides "StarCraft 2", players can compete for thousands of dollars of prize money in "Halo: Reach", a sci-fi shooter, or "Call of Duty: Modern Warfare 2", a war game.

The idea of staging video-game tournaments for money has been around for a while. In 1997 Dennis Fong, an American gamer, won a Ferrari with his brilliant playing of "Quake", an early first-person shooter. Since then professional players have also done well with other games—such as "CounterStrike", another shooter, or "Warcraft 3", a strategy game. The predecessor game of "StarCraft 2" has been on cable television in South Korea

for more than a decade. Good players there can make a reasonable living from salaries, sponsorship and prize money, and the very best can earn hundreds of thousands of dollars a year. Yet although MLG and similar organisations have been hosting tournaments for years, professional gaming has been slower to catch on in the West.

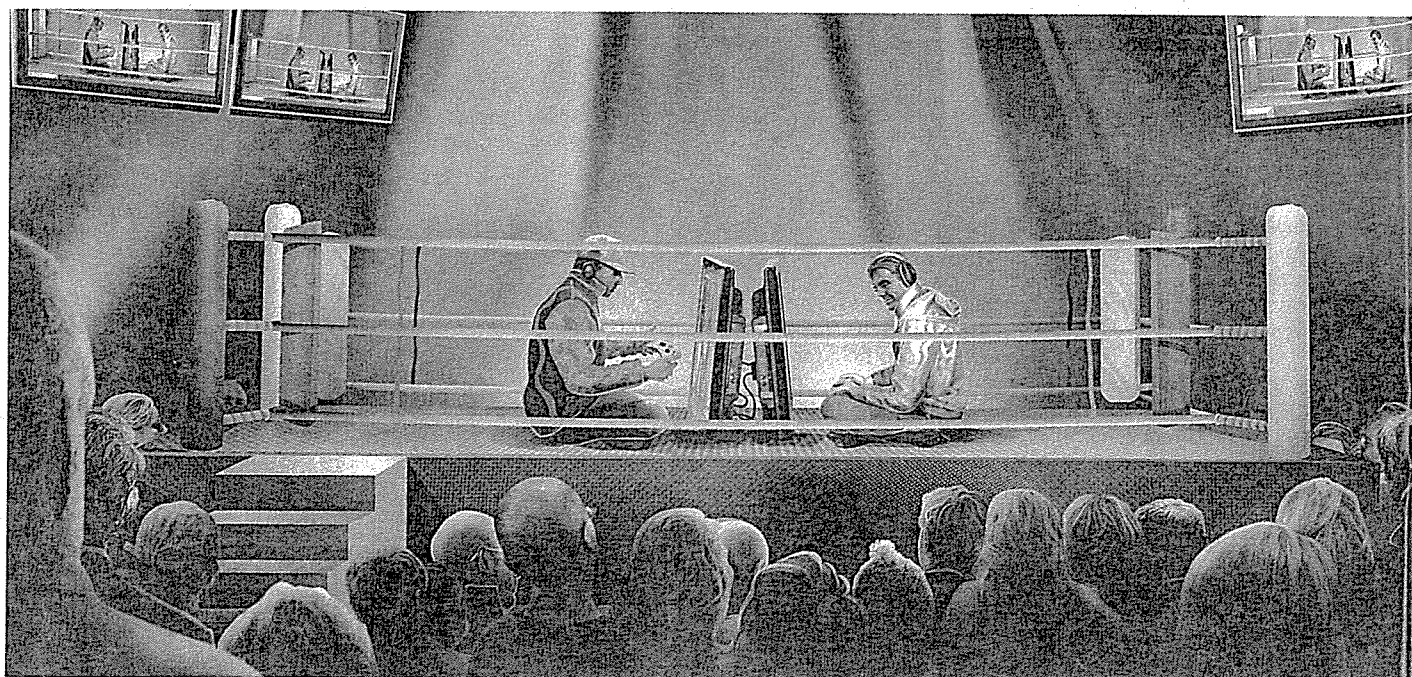
After the release of "StarCraft 2", that seems to be changing. Each of MLG's events this year has set new viewing records. Besides the 15,000 who attended in person, the online live audience for the Orlando tournament peaked at more than 181,000 people in 163 countries.

MLG is only one of a number of firms offering such contests. They range from weekly online-only events that pay out \$100 all the way up to glitzy affairs like the Global StarCraft League, a South Korean tournament that pays out 145m won (\$127,000) every couple of months. IGN, a gaming website owned by News Corporation, runs the IGN Pro League, which

Good players can make a reasonable living from salaries, sponsorship and prize money, and the very best can earn hundreds of thousands of dollars a year

offers \$30,000 to its champion. Sweden plays host to Dreamhack, a twice-yearly games party with a prize pool of 400,000 kroner (\$57,000). The best players can make serious money (see table 3, next page), but Shawn Simon, an American "StarCraft 2" professional, reckons that, even outside that elite, "StarCraft 2" alone probably provides a living for about 100 players worldwide. "I've been continually shocked by how fast it's grown," says Dustin Browder, the game's chief designer.

Sundance diGiovanni, MLG's founder and chief executive, concedes that many people still think playing video games for money is a strange idea. Like any sport, video games have a culture that can be baffling to outsiders. Rather like professional wrestlers, gamers tend to play under pseudonyms, so Messrs Fields, Lim and Simon are known to their fans as "IdrA", "Boxer" ►►



Play and be paidTop "StarCraft 2" players
March 2010–November 2011

Player	Winnings, \$'000
☉ Lim "NesTea" Jae Duk	227
☉ Jeong "Mvp" Jong Hyeon	227
☉ Jang "MC" Min Chul	222
☉ Choi "Polt" Seong Hun	109
☉ Lee "MarineKing" Jung Hoon	105
☉ Kim "Fruit-Dealer" Won Gi	102
☉ Mun "MMA" Seong-Won	99
☉ Lee "PuMa" Ho Joon	76
☉ Ilyes "Stephano" Satouri	73
☉ Lee "Leenock" Dong Nyung	63

☉ South Korea ☐ France

Sources: Sc2earnings.com; The Economist

play against professionals, which would be unthinkable in, say, professional football or basketball. Thanks to video-streaming sites like Justin.tv, players can broadcast their practice sessions online and chat with fans in real time, and enthusiastic amateurs can televise tournaments organised in their living rooms.

Game designers can help, too. "StarCraft 2" was conceived from the start to offer a good experience for spectators, says Mr Browder. It may be hard for new viewers to appreciate the players' skill, at least until they try it themselves, but the game is meant to be appealing to everyone. So for newcomers who have yet to master the finer points, "we can offer the visual spectacle of alien races battling to the death for your own amusement."

Winning streak

Other developers are piling in. Riot Games is pushing "League of Legends", a free-to-play fantasy team game played online by around 4m people every day that often attracts more viewers than StarCraft 2 to its professional matches. For the game's second season of competitive play the company is offering a \$5m prize pool. Valve, another big PC developer, is hoping to break in with "Defence of the Ancients 2", a direct rival to "League of Legends"; in August this year it hosted a tournament for an early version of the game with a first prize of \$1m.

The buzz around these games is helping to attract interest from sponsors. Big brands such as Coca-Cola, Red Bull, Samsung and Intel have all sponsored tournaments recently. They see this as a good way of getting exposure to a sought-after but hard-to-reach group of people: males in their late teens and early 20s, who make up the bulk of the audience. And many of the fans are unusually dedicated. One of those who attended MLG's Orlando event had come all the way from California. Another had bet a tattoo on the outcome of one match. And when it emerged that the Korean StarCraft pro Lee Jung-Hoon (a.k.a. "MarineKing"), a favourite with the fans, would not be able to get to Orlando, a donation drive raised the \$3,500 needed to fly him there for the weekend.

And Mr Lim? Alas, his comeback was not to be. Mr Fields held his nerve and, to the crowd's cheers, took the final game. ■

and "Sheth". Some critics are bothered by the absence of physical exertion, but that never held back chess.

E-sports can be a boom-and-bust business, says Mr di Giovanni, with fans' interest waxing as a big new game is released and then waning again; and it is definitely for the cognoscenti. Yet the overall trend is strongly upwards. One reason, says Sean Plott, a "StarCraft" player turned commentator, is generational: video games are becoming more mainstream as the people who grew up playing them for fun turn into adults with the disposable income to spend on watching the pros.

Technology has made it easier to build tightly knit fan communities. Web-gaming services such as Microsoft's Xbox Live or Blizzard's Battle.net offer skilled amateurs a chance to

Violence and addiction**No killer app****The moral panic about video games is subsiding**

IN THE LATE morning of April 20th 1999 a pair of teenagers, Dylan Klebold and Eric Harris, walked into the cafeteria at Columbine High School in Colorado and began gunning down their classmates. The two senior-year students killed 13 people in a 45-minute rampage before turning their weapons on themselves. The massacre remains the deadliest high-school shooting in American history.

In the days after the killings it emerged that, besides enjoying violent movies, the two liked playing "Doom", a gory video game from the mid-1990s in which the heavily armed players use shotguns and rocket launchers to dispose of legions of zombies and demons. Parents, politicians and psychiatrists fretted that exposure to virtual violence had prepared the ground for the real-world killings. Two years later the parents of some of the victims sued dozens of gaming companies, including id Software, the developers of "Doom", alleging that their products had contributed to the murders.

The massacre fed long-standing worries about video games, particularly in America, the industry's biggest national market. Governments from California to Switzerland have tried to ban the sale of violent games to children, and most countries have an age-rating system similar to that for films.

However, since gaming has become more mainstream, the proportion of violent games has fallen. According to vgchartz, a website that tracks games sales, the ten bestselling console games of 2010 included just three violent shooters. The rest were inoffensive sports and fitness titles, a Super Mario platform-jumping game and a Pokémon product, a cartoony franchise of games based on a Japanese TV series for children. Many games that do feature violence serve up a slapstick version. The sort of gruesomely realistic killings found in serious war films are rare.

Still, many games require the player to dispose of great numbers of Nazis, gangsters, aliens and other bad guys. A few games serve up stylised violence for its own sake. And the critics say there is a crucial difference between films, plays or books, where the players are just passive onlookers, and video games, where they are active participants in the simulated slayings. That, the argument goes, makes it more likely that they will resort to violence in the real world, too.

It's all in the mind

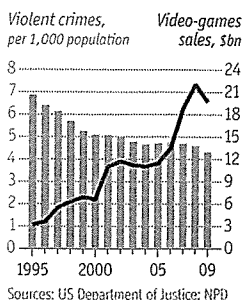
But the evidence is hard to pin down. Violent crime in America, Britain and Japan, the three biggest video-game markets, has dropped over the past decade at the same time as sales of video games have soared (see chart 4, next page). That does not, by itself, exonerate the industry—after all, without games violent crime might have fallen still further. And several studies purport to show that playing violent video games raises aggression levels. But Chris Ferguson, a psychologist at Texas A&M International University, points out that much of this work is of poor quality. In a meta-analysis published in 2007, he found no evidence that games made their players violent. Indeed, after decades of research, he has concluded that violence in any media has little or no effect on their consumers. A review commissioned by the Australian attorney-general, published last year, ►►

SPECIAL REPORT

VIDEO GAMES

Not proven

United States:



That sensation of losing track of time will be familiar to most gamers. Again, critics point to the interactive nature of video games, which allows their designers to tweak risks and rewards to make them irresistible. Some countries, including China and South Korea, are attempting to limit the number of hours that youngsters can play online games. Even games developers themselves have expressed concern about online games that rely on keeping players hooked. But there is no suggestion that games are addictive in the sense that they create physical dependence in their players. That makes them akin to other compelling but legal pastimes, such as gambling, following a football club or collecting stamps.

There is a long tradition of dire warnings about new forms of media, from translations of the Bible into vernacular languages to cinema and rock music. But as time passes such novelties become uncontroversial, and eventually some of them are elevated into art forms. That mellowing process may already be under way as the average game-player gets older. Mr Ferguson notes wryly that the latest targets of attack are social media such as Facebook and Twitter, which are said to expose children to paedophiles; invade their users' privacy and facilitate riots. Perhaps video games are not so bad. ■

Alternative uses

The play's the thing

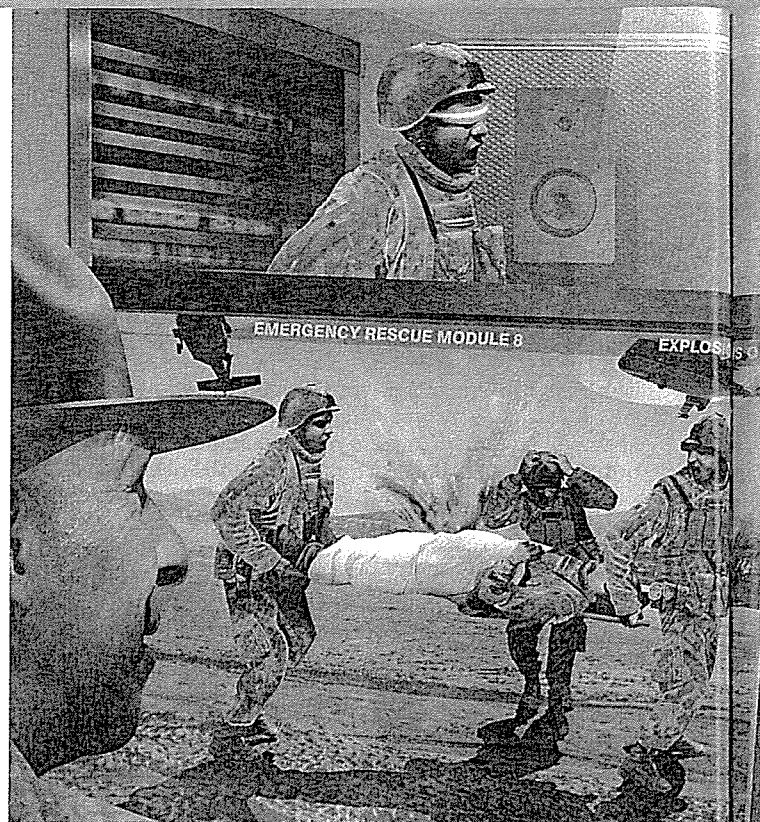
What video-game technology can do in the real world

A DECADE AGO the computer industry was abuzz with talk about "virtual reality" that would allow the construction of convincing digital facsimiles of the real world. As it turns out, the games industry has come quite close to delivering this. Modern games use cheap hardware and software to create three-dimensional worlds with convincing textures and lighting, objects that obey real-world laws of physics and realistic sounds. Such worlds are constructed mostly to allow players to race fantasy cars across them or defend them from invading aliens. But they also have more practical uses.

Codemasters is a British developer that specialises in driving games, including a Formula One racing simulator. Its fans demand a faithful recreation of the experience, says Rod Cousens, its chief executive. The firm's software can simulate real-world cars in almost every detail, and the circuits within the game are

backed this up.

But might players not get addicted to gaming? In 1983 David Sudnow, a sociologist, wrote a bestselling book, "Pilgrim in the Micro-world", in which he described his obsession with a game called "Breakout". It consists of the player bouncing a ball off a paddle to destroy a collection of bricks on the screen. "Thirty seconds of play...and I'm on a whole new plane of being, all synapses wailing," he wrote.



true-to-life recreations of racecourses such as Silverstone and Monza. When Formula One went to India for the first time this year, the virtual version of the track was ready before the real one; several drivers took advantage of his company's software to practise. "We can recreate every aspect of the track from data given to us by the F1 authorities", explains Mr Cousens.

Toy soldiers

Warfare seems an obvious application for games technology. "Steel Beasts", a tank-warfare simulation game developed by California-based eSim Games, is reportedly being used by several Western armies. The Canadian, British and Australian armed forces have experimented with training their soldiers on "Virtual Battle Space 2", a tweaked version of "Arma 2", a military wargame developed by Bohemia Interactive, a Czech games firm. Players take on the role of an individual soldier alongside dozens of other human allies or opponents. They can issue commands to computer-controlled squadmates, fire virtual versions of a variety of weapons used by armies around the world and drive tanks and armoured vehicles, all in an environment of hundreds of square kilometres that alternates between day and night and offers weather effects such as fog and rain.

Armies have long used machines to simulate expensive bits of kit such as jet fighters or tanks, says Peter Morrison, who runs the part of Bohemia Interactive that focuses on the military market. But simulating the experience of individual soldiers is something new. Cost apart, his products offer other advantages over the real world. If a commander wants his troops to practise infantry combat in the fog, he does not have to wait for the weather to oblige; he can conjure it up on his computer.

Satellite images and geographical data can be fed into the software to generate virtual representations of real places, allowing soldiers to rehearse specific missions. "It's quite likely that the [American special forces] team that killed Osama bin Laden would have rehearsed the raid in some sort of virtual environment," says someone familiar with the military-training business. And since everything the soldiers do is recorded by their computers, data from the mission can be analysed afterwards.

There are lots of other possibilities. In 2002 the United States army released "America's Army", a game based on a com- ➤

SIMULATION
IN PROGRESS

SPECIAL REPORT VIDEO GAMES



► commercial software package used in dozens of straightforward consumer games, as a recruitment tool. It has been downloaded millions of times and is still played online.

Companies are getting interested too. Business-simulation games are available for everyone from managers to call-centre workers and have been used by companies from Coca-Cola to Shell. "Doing this sort of business education as a game can make it more compelling than a traditional chalk-and-blackboard approach," says Tim Luft, of the Serious Games Institute, a research outfit in Coventry, England. His researchers are working on virtual stores for a retail firm and a three-dimensional computer version of the city of Coventry for use by architects and planners in local government. "Big companies could build this kind of software in-house," Mr Cousens concedes. "But why would they? We've spent years and millions of dollars getting it just right. It's easier to just buy it off the shelf."

Even as software written for the games industry is being put to serious uses, the element of fun in games is being exploited through the latest management tool, "gamification". This relies on working out what makes video games enjoyable and applying the same techniques to other kinds of activities, from running a business to tackling tricky scientific problems. It may seem a strange notion, but there is something in it. A good example comes from molecular biology—more specifically, the quest to understand the way in which proteins fold.

Proteins are complicated chemicals made of long chains of amino acids, the tiny chemical building blocks of life. Those chains can fold up in billions of different ways, and the process by which they arrive at the correct one is still poorly understood. It is vitally important, because misfolded proteins either do not work at all or do things that they shouldn't. Badly folded proteins are implicated in various forms of cancer as well as neurological diseases such as Alzheimer's and Parkinson's.

Computers can recognise a well-folded protein when presented with one, but actually finding it calls for the sort of pattern recognition and lateral thinking that they struggle with. Scientists have tried to deal with the problem by using enormous computing power to sift systematically through billions of possible configurations. But in 2008 a team from the University of Washington tried a different approach.

They released a program called "Foldit" that turned protein-folding into a free online puzzle game. Players are presented with a protein and given the task of finding its most energy-efficient shape by fiddling with its structure. A better shape means a higher score; dramatic progress is rewarded with lots of extra points, pleasing sound effects and a little shower of virtual streamers. The controls are simple and intuitive, and there are friendly tutorials to tell novices what to do. Online leaderboards let players compare solutions to foster competition.

By turning their problem into a game, the scientists have harnessed thousands of human brains without specialist knowledge to work on protein-folding, says Adrien Treuille, a computer scientist at the University of Columbia who helped to develop the program. "We wanted a toy," he says, "something so beautiful and such fun that you could pick it up and start playing with it without any formal training." Vital lessons were learned from professional games developers. "We needed to have a very vivid representation of what was going on. We needed an intuitive interface, and something called 'juiciness'—a game-designer's term for lots of instant positive feedback."

"Foldit" and its 46,000-plus users have already made serious contributions to biology. A paper published in the September issue of *Nature Structural and Molecular Biology* shows that "Foldit" players were better than any computer algorithm at modelling the structure of a protein used by retroviruses such as HIV, which causes AIDS. And in the best video-game tradition a sequel, called "EteRNA", is already in the works. It will allow users to investigate RNA synthesis.

In business, gamification has become increasingly fashionable over the past year or two. The point about games is that they make players want to perform difficult tasks and pay for the privilege, says Brian Burke of Gartner, a consultancy. Gamifiers try to capture that sense of engagement by providing rapid, continuous feedback, a clear sense of progression and goals that are challenging enough to maintain interest but not so hard as to put players off. One example is FourSquare, a social network (and rival to Facebook) that lets users post their present location for their friends to see. Those who visit a particular place (such as a restaurant or a pub) are given badges. The most dedicated are awarded titles such as "Adventurer" (for ticking ten separate locations) and may be crowned "mayor" of the place. A text-based scoring system is keeping people engaged. Since its launch in 2009 the service has picked up more than 10m users.

Easy, peasy

Another example comes from Britain's Department for Work and Pensions, which is offering a gamified version of a suggestion box. Staff who come up with ideas to improve the business are awarded points called "DWP peas" that can be invested in promising suggestions made by other people. If the boss gives the go-ahead, the investors get their points back with interest, thus increasing their total. A leaderboard and a "buzz index" provide the element of competition.

But not everyone is convinced. A lot of gamification efforts do not seem to offer anything very different from the old rules of good management. The motivating power of competition and leaderboards are familiar to sales managers, who have had salesman-of-the-month contests for many years. Games designers themselves say that the emphasis on rewards and feedback systems may be missing the point: if the job itself is tedious and repetitive, such bells and whistles can come across as patronising. Mr Burke accepts this. "Gamification can be powerful, but you have to use it carefully," he says. "A lot of what's going on at the moment is driven by little more than novelty and hype." ■

The importance of fun

Homo ludens

Why video games will be an enduring success

WHICH WAS THE very first video game? One plausible candidate is "Nim", a mathematical game with roots in China. It was played on NIMROD, a computer created by Ferranti, an electronics firm, for the 1951 Festival of Britain. In 1952 Alexander Douglas, a British computer scientist, wrote a version of noughts and crosses for the pioneering EDSAC computer at the University of Cambridge. Shooting games made their debut with "Space-war!", written in 1961 by students at the Massachusetts Institute of Technology for a basic computer called the PDP-1. In the post-war years computing was a brand new technology, but games seem to have been among the first applications that the creators of those early computers thought of.

Half a century later they have become the most exciting branch of the entertainment industry. They are a "killer app" that is helping to drive mobile-phone sales, and a key ingredient in the popularity of social-networking sites.

Should other media firms worry that games will take over? The numbers can look ominous. In revenue terms, video games already dwarf radio. They are twice the size of the music business and by 2015 will be worth more than the newspaper industry. Just before the recession the games industry was growing by 20-25% a year. Things have slowed down since then, but gaming is still expected to grow by an average of over 8% a year between now and 2015, and is likely to remain the fastest-growing part of the media industry over that period.

The history of media technologies suggests that it is rare for any of them to be entirely superseded by others. Long-playing

The main reason why games are different is that they marry the power of modern technology to the insatiable human desire for play

records did not make live concerts obsolete. Television did not kill radio. Books still sell in the age of the internet. This is known as "Riepl's law", after a German newspaper editor who first noticed the effect in 1913. The chances are that, even if video games overtake books and television (and they are still a long way from doing so), the earlier forms will survive alongside them.

That is not to say that they will remain untouched. Video games will influence other parts of the entertainment industry and in turn be influenced by them. For example, "The Matrix", a film that first appeared in 1999, had two sequels that could be fully understood only by playing a video game called "Enter the Matrix". The game continued after the third film as "The Matrix Online", an internet-based multiplayer version that ran until 2009. Video games based on popular films or novels have been around for a long time, but now the ideas are beginning to flow the other way. Books based on the "Halo" series of sci-fi shooting games, for instance, have sold over 1m copies.

Sometimes games have offered a new way for old media to make money. Musical games such as "Rock Band" and "Guitar Hero" marry the video-games industry with the music business. These games use controllers shaped like guitars, drums and mi-

crophones to let players step into the shoes of their favourite bands. The first licensed use of the Beatles' music outside their own albums, in 2009, came in the shape of "The Beatles: Rock Band", a game rumoured to have earned the Fab Four tens of millions of dollars in royalties.

But there is something fundamentally different about games that sets them apart from traditional media such as books and films. Games developers say that technology is pushing back the frontiers of their business in a way that is simply not open to, say, books or radio. They point to improving graphics, better artificial intelligence and bigger worlds featured in their products. The more business-minded may argue that games offer better value for money than films do. Some will say that it is a generational thing, and that people who use computers in every area of life will naturally expect to use them for entertainment as well.

All these things are true.

But the main reason why games are different is that, rather than being consumed passively like all the other media, they are interactive, marrying the power of modern technology to the human desire for play. The compulsion to play is hard-wired into the human race. It is the way people learn. Organised play offers a (fairly) safe outlet for competitive impulses that might otherwise get out of hand. Games, sports and contests feature in every documented human culture. People fill their leisure time with a dizzying variety of games, both sporty and brainy, and as participants as well as spectators. The final match in the 2010s soccer World Cup was watched by hundreds of millions of people, making this one of the most widely shared cultural events in history.

What the video-games industry has done is to make much of this activity better and more convenient for the players. Video games can offer anything from electronic versions of traditional pastimes, such as poker or rugby, to totally new experiences, such as abstract brain-teasers, simulations of warfare and intricate alternative realities. Consoles provide a cinematic treat in the living room; mobile phones a quick fix on the move. Thanks to the internet, opponents and team mates are never more than a few clicks away. Anyone equipped with the appropriate hardware—which in rich countries is becoming ever more affordable, as well as ever more varied—can now play any game they like, whenever and wherever they want, with anyone they choose. Ultimately the market for electronic games is limited only by the world's appetite for fun and enjoyment. ■



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