



# CASE 18

## THE HOME VIDEOGAME INDUSTRY: THE FIRST FOUR DECADES

### AN INDUSTRY IS BORN

In 1968, Nolan Bushnell, the 24-year-old son of a Utah cement contractor, graduated from the University of Utah with a degree in engineering.<sup>1</sup> Bushnell then moved to California, where he worked briefly in the computer graphics division of Ampex. At home, Bushnell turned his daughter's bedroom into a laboratory. There, he created a simpler version of Space War, a computer game that had been invented in 1962 by an MIT graduate student, Steve Russell. Bushnell's version of Russell's game, which he called Computer Space, was made of integrated circuits connected to a 19-inch, black-and-white television screen. Unlike a computer, Bushnell's invention could do nothing but run the game, which meant that, unlike a computer, it could be produced cheaply.

Bushnell envisioned videogames like his standing next to pinball machines in arcades. With hopes of having his invention put into production, Bushnell left Ampex to work for a small pinball company that manufactured 1,500 copies of his videogame. The game never sold, primarily because the player had

to read a full page of directions before playing—way too complex for arcade gaming. Bushnell left the pinball company and with a friend, Ted Dabney, put up \$500 to start a company that would develop a simpler videogame. They wanted to call the company Syzygy, but the name was already taken, so they settled on Atari, a Japanese word that is the equivalent of “check in the go.”

In his home laboratory, Bushnell built the simplest game he could think of. People knew the rules immediately, and it could be played with one hand. The game was modeled on table tennis, and players batted a ball back and forth with paddles that could be moved up and down sides of a court by twisting knobs. He named the game Pong after the sonarlike sound that was emitted every time the ball connected with a paddle.

In Fall 1972, Bushnell installed his prototype for Pong in Andy Capp's tavern in Sunnyvale, California. The only instructions were “avoid missing the ball for a high score.” In the first week, 1,200 quarters were deposited in the casserole dish that served for a coin box in Bushnell's prototype. Bushnell was ecstatic; his simple game had brought in \$300 in a

week. The pinball machine that stood next to it averaged \$35 a week.

Lacking the capital to mass produce the game, Bushnell approached established amusement game companies, only to be repeatedly shown the door. Down but hardly out, Bushnell cut his hair, put on a suit, and talked his way into a \$50,000 line of credit from a local bank. He set up a production line in an abandoned roller-skating rink and e-hired people to assemble machines while Led Zeppelin and the Rolling Stones were played at full volume over the speaker system of the rink. Among his first batch of employees was a skinny, 17-year-old named Steve Jobs, who would later found Apple Computer, NeXT, and Pixar. Like others, Jobs had been attracted by a classified ad that read “Have Fun and Make Money.”

In no time at all, Bushnell was selling all the machines that his small staff could make—about 10 per day—but to grow, he needed additional capital. While the ambience at the rink, with its mix of rock music and marijuana fumes, put off most potential investors, Don Valentine, one of the country’s most astute and credible venture capitalists, was impressed with the growth story. Armed with Valentine’s money, Atari began to increase production and expand their range of games. New games included Tank and Breakout; the latter was designed by Jobs and a friend of his, Steve Wozniak, who had left Hewlett-Packard to work at Atari.

By 1974, 100,000 Ponglike games were sold worldwide. Although Atari manufactured only 10% of the games, the company still made \$3.2 million that year. With the Pong clones coming on strong, Bushnell decided to make a Pong system for the home. In fact, Magnavox had been marketing a similar game for the home since 1972, although sales had been modest.<sup>2</sup> Bushnell’s team managed to compress Atari’s coin-operated Pong game down to a few inexpensive circuits that were contained in the game console. Atari’s Pong had a sharper picture and more sensitive controllers than Magnavox’s machine; it also cost less. Bushnell then went on a road show, demonstrating Pong to toy buyers, but he received an indifferent response and no sales. A dejected Bushnell returned to Atari with no idea of what to do next. Then the buyer for the sporting goods department at Sears came to see Bushnell, examined the machine, and offered to buy every home

Pong game Atari could make. With Sears’s backing, Bushnell boosted production. Sears ran a major television ad campaign to sell home Pong, and Atari’s sales soared, hitting \$450 million in 1975. The home videogame had arrived.

## BOOM AND BUST

Nothing attracts competitors like success. By 1976, about 20 different companies were crowding into the home videogame market, including National Semiconductor, RCA, Coleco, and Fairchild. Recognizing the limitations of existing home videogame designs, Fairchild came out in 1976 with a home videogame system capable of playing multiple games. The Fairchild system consisted of three components—a console, controllers, and cartridges. The console was a small computer optimized for graphics-processing capabilities. It was designed to receive information from the controllers, process it, and send signals to a television monitor. The controllers were handheld devices used to direct on-screen action. The cartridges contained chips encoding the instructions for a game. The cartridges were designed to be inserted into the console.

In 1976, Bushnell sold Atari to Warner Communications for \$28 million. Bushnell stayed on to run Atari. Backed by Warner’s capital, in 1977, Atari developed and brought out its own cartridge-based system, the Atari 2600. The 2600 system sold for \$200, and associated cartridges retailed for \$25 to \$30. Sales surged during the 1977 Christmas season. However, a lack of manufacturing capacity on the part of market leader Atari, and a very cautious approach to inventory by Fairchild, led to shortages and kept sales significantly below what they could have been. Fairchild’s cautious approach was the result of prior experience in consumer electronics. A year earlier, it had increased demand for its digital watches only to accumulate a buildup of excess inventory that caused the company to take a \$24.5 million write-off.<sup>3</sup>

After the 1977 Christmas season, Atari claimed to have sold about 400,000 units of the 2600 VCA, about 50% of all cartridge-based systems in American homes. Atari had also earned more than \$100 million

in sales of game cartridges. By this point, second-place Fairchild sold around 250,000 units of its system. Cartridge sales for the year totaled about 1.2 million units, with an average selling price of \$20. Fresh from this success and fortified by market forecasts predicting sales of 33 million cartridges and an installed base of 16 million machines by 1980, Bushnell committed Atari to manufacturing 1 million units of the 2600 for the 1978 Christmas season. Atari estimated that total demand would reach 2 million units. Bushnell was also encouraged by signals from Fairchild that it would again be limiting production to around 200,000 units. At this point, Atari had a library of 9 games; Fairchild had 17.<sup>4</sup>

Atari was not the only company excited by the growth forecasts. In 1978, a host of other companies, including Coleco, National Semiconductor, Magnavox, General Instrument, and a dozen other companies, entered the market with incompatible cartridge-based home systems. The multitude of choices did not entice consumers, however, and the 1978 Christmas season brought unexpectedly low sales. Only Atari and Coleco survived an industry shakeout. Atari lost Bushnell, who was ousted by Warner executives. (Bushnell went on to start Chuck E. Cheese Pizza Time Theater, a restaurant chain that had 278 outlets by 1981.) Bushnell later stated that part of the problem was a disagreement over strategy. Bushnell wanted Atari to price the 2600 at cost and make money on sales of software; Warner wanted to continue making profits on hardware sales.<sup>5</sup>

Several important developments occurred in 1979. First, several game producers and programmers defected from Atari to set up their own firm, Activision, and to make games compatible with the Atari 2600. Their success encouraged others to follow suit. Second, Coleco developed an expansion module that allowed its machine to play Atari games. Atari and Mattel (which entered the market in 1979) did likewise. Third, three new games were introduced to the home market—Space Invaders, Asteroids, and PacMan. All three were adapted from popular arcade games, and all three helped drive demand for players.

Demand recovered strongly in late 1979 and kept growing for the next three years. In 1981, U.S. sales of home videogames and cartridges hit \$1 billion. In 1982, they surged to \$3 billion, with Atari accounting for half of this amount. It seemed as if Atari could do no wrong; the 2600 was everywhere. About

20 million units were sold, and by late 1982, numerous independent companies, including Activision, Imagic, and Epyx, were producing hundreds of games for the 2600. Second-place Coleco was also doing well, partly because of a popular arcade game, Donkey Kong, which it had licensed from the Japanese company Nintendo.

Atari was also in contact with Nintendo. In 1982, the company very nearly licensed the rights to Nintendo's Famicom, a cartridge-based videogame system machine that was a big hit in Japan. Atari's successor to the 2600, the 5200, was not selling well; the Famicom seemed like a good substitute. Negotiations broke down, however, when Atari discovered that Nintendo had extended its Donkey Kong license to Coleco. This allowed Coleco to port a version of the game to its home computer, which was a direct competitor to Atari's 800 home computer.<sup>6</sup>

After a strong 1982 season, the industry hoped for continued growth in 1983. Then the bottom dropped out of the market. Sales of home videogames plunged to \$100 million. Atari lost \$500 million in the first 9 months of the year, causing the stock of parent company Warner Communications to drop by half. Part of the blame for the collapse was laid at the feet of an enormous inventory overhang of unsold games. About 15 to 20 million surplus game cartridges were left over from the 1982 Christmas season (in 1981, there were none). On top of this, some 500 new games hit the market in 1983. The average price of a cartridge plunged from \$30 in 1979 to \$16 in 1982, and then to \$4 in 1983. As sales slowed, retailers cut back on the shelf space allocated to video games. It proved difficult for new games to make a splash in a crowded market. Atari had to dispose of 6 million "ET: The Extraterrestrial" games. Meanwhile, big hits from previous years such as Pac Man were bundled with consoles and given away free to try to encourage system sales.<sup>7</sup>

Surveying the rubble, commentators claimed that the videogame industry was dead. The era of dedicated game machines was over, they claimed. Personal computers were taking their place.<sup>8</sup> It seemed to be true. Mattel sold off its game business, Fairchild moved on to other things, Coleco folded, and Warner decided to break up Atari and sell its constituent pieces—at least, those pieces for which it could find a buyer. No one in America seemed to want to have anything to do with the home videogame

business—no one, that is, except for Minoru Arakawa, the head of Nintendo's U.S. subsidiary, Nintendo of America (NOA). Picking through the rubble of the industry, Arakawa noticed that there were people who still packed video arcades, bringing in \$7 billion a year, more money than the entire movie industry. Perhaps it was not a lack of interest in home videogames that had killed the industry. Perhaps it was bad business practice.

## THE NINTENDO MONOPOLY

Nintendo was a century-old Japanese company that had built up a profitable business making playing cards before diversifying into the videogame business. Based in Kyoto and still run by the founding Yamauchi family, the company diversified into the videogame business in the late 1970s. The first step was to license videogame technology from Magnavox. In 1977, Nintendo introduced a home videogame system in Japan based on this technology that played a variation of Pong. In 1978, the company began to sell coin-operated videogames. It had its first hit with Donkey Kong, designed by Sigeru Miyamoto.

### The Famicom

In the early 1980s, the company's boss, Hiroshi Yamauchi, decided that Nintendo had to develop its own videogame machine. He pushed the company's engineers to develop a machine that combined superior graphics-processing capabilities and low cost. Yamauchi wanted a machine that could sell for \$75, less than half the price of competing machines at the time. He dubbed the machine the Family Computer, or Famicom. The machine that his engineers designed was based on the controller, console, and plug-in cartridge format pioneered by Fairchild. It contained two custom chips—an 8-bit central processing unit and a graphics-processing unit. Both chips had been scaled down to perform only essential functions. A 16-bit processor was available at the time, but to keep costs down Yamauchi refused to use it.

Nintendo approached Ricoh, the electronics giant, which had spare semiconductor capacity. Employees at Ricoh said that the chips had to cost no more than 2,000 yen. Ricoh thought that the 2,000-yen price point was absurd. Yamauchi's response was to guarantee Ricoh a 3-million-chip order within 2 years. Since the leading companies in Japan were selling, at most, 30,000 video games per year at the time, many within the company viewed this as an outrageous commitment, but Ricoh went for it.<sup>9</sup>

Another feature of the machine was its memory—2,000 bytes of random access memory (RAM), compared to the 256 bytes of RAM in the Atari machine. The result was a machine with superior graphics-processing capabilities and faster action, which could handle far more complex games than Atari's. Nintendo engineers also built a new set of chips into the game cartridges. In addition to chips that held the game program, they developed memory map controller (MMC) chips that took over some of the graphics-processing work from the chips in the console and enabled the system to run more complex games. With the addition of the MMC chips, the potential for more sophisticated, more complex games had arrived. Over time, Nintendo engineers developed increasingly powerful MMC chips, enabling the basic 8-bit system to perform in ways that originally seemed out of reach. The engineers also figured out a way to include a battery backup system in cartridges that allowed some games to store information independently—to keep track of where a player had left off or to track high scores.

### The Games

Yamauchi recognized that great hardware would not sell itself. The key to the market, he reasoned, was great games. Yamauchi had instructed the engineers developing the hardware to make sure that "it was appreciated by software engineers." Nintendo decided that it would become a haven for game designers. "An ordinary man," Yamauchi said, "cannot develop good games no matter how hard he tries. A handful of people in this world can develop games that everyone wants. Those are the people we want at Nintendo."<sup>10</sup>

Yamauchi had an advantage in the person of Sigeru Miyamoto. Miyamoto had joined Nintendo at the age of 24. Yamauchi had hired Miyamoto, a graduate of Kanazawa Muncipal College of Industrial Arts,

as a favor to his father and an old friend, although he had little idea what he would do with an artist. For 3 years, Miyamoto worked as Nintendo's staff artist. Then, in 1980, Yamauchi called Miyamoto into his office. Nintendo had started selling coin-operated videogames, but one of the new games, *Radarscope*, was a disaster. Could Miyamoto come up with a new game? Miyamoto was delighted. He had always spent a lot of time drawing cartoons, and as a student he had played videogames constantly. Miyamoto believed that videogames could be used to bring cartoons to life.<sup>11</sup>

The game Miyamoto developed was nothing short of a revelation. At a time when most coin-operated videogames lacked characters or depth, Miyamoto created a game around a story that had both. Most games involved battles with space invaders or heroes shooting lasers at aliens; Miyamoto's game did neither. Based loosely on *Beauty and the Beast* and *King Kong*, Miyamoto's game involved a pet ape who runs off with his master's beautiful girlfriend. His master is an ordinary carpenter called Mario, who has a bulbous nose, a bushy mustache, a pair of large, pathetic eyes, and a red cap (which Miyamoto added because he was not good at hairstyles). He does not carry a laser gun. The ape runs off with the girlfriend to get back at his master, who was not especially nice to the beast. The man, of course, has to get his girlfriend back by running up ramps, climbing ladders, jumping off elevators, and the like, while the ape throws objects at the hapless carpenter. Since the main character is an ape, Miyamoto called him Kong; because the main character is as stubborn as a donkey, he called the game *Donkey Kong*.

Released in 1981, *Donkey Kong* was a sensation in the world of coin-operated video arcades and a smash hit for Nintendo. In 1984, Yamauchi again summoned Miyamoto to his office. He needed more games, this time for Famicom. Miyamoto was named the head of a new research and development (R&D) group and told to come up with the most imaginative videogames ever.

Miyamoto began with Mario from *Donkey Kong*. A colleague had told him that Mario looked more like a plumber than a carpenter, so a plumber he became. Miyamoto gave Mario a brother, Luigi, who was as tall and thin as Mario was short and fat. They became the Super Mario Brothers. Plumbers spend their time working on pipes; so large, green sewer pipes became obstacles and doorways into secret worlds. Mario and

Luigi's task was to search for the captive Princess Toadstool. Mario and Luigi are endearing bumblers, unequal to their tasks yet surviving. They shoot, squash, or evade their enemies—including flying turtles, stinging fish, maneating flowers, and fire-breathing dragons—while they collect gold coins, blow air bubbles, and climb vines into smiling clouds.<sup>12</sup>

*Super Mario Brothers* was introduced in 1985. For Miyamoto, this was just the beginning. Between 1985 and 1991, Miyamoto produced eight Mario games. About 60 to 70 million were sold worldwide, making Miyamoto the most successful game designer in the world. After adapting *Donkey Kong* for Famicom, he went on to create other top-selling games, including another classic, *The Legend of Zelda*. While Miyamoto drew freely from folklore, literature, and pop culture, the main source for his ideas was his own experience. The memory of being lost among a maze of sliding doors in his family's home was recreated in the labyrinths of the *Zelda* games. The dog that attacked him when he was a child attacks Mario in *Super Mario*. As a child, Miyamoto had once climbed a tree to catch a view of far-off mountains and had become stuck. Mario gets himself in a similar fix. Once Miyamoto went hiking without a map and was surprised to stumble across a lake. In the *Legend of Zelda*, part of the adventure is in walking into new places without a map and being confronted by surprises.

## Nintendo in Japan

Nintendo introduced Famicom into the Japanese market in May 1983. Famicom was priced at \$100, more than Yamauchi wanted but significantly less than the products of competitors. When he introduced the machine, Yamauchi urged retailers to forgo profits on the hardware because it was just a tool to sell software, and that is where they would make their money. Backed by an extensive advertising campaign, 500,000 units of Famicom were sold in the first 2 months. Within a year, the figure stood at 1 million, and sales were still expanding rapidly. With the hardware quickly finding its way into Japanese homes, Nintendo was besieged with calls from desperate retailers frantically demanding more games.

At this point Yamauchi told Miyamoto to come up with the most imaginative games ever. However, Yamauchi also realized that Nintendo alone could not satisfy the growing thirst for new games, so he initiated

a licensing program. To become a Nintendo licensee, companies had to agree to an unprecedented series of restrictions. Licensees could issue only five Nintendo games per year, and they could not write those titles for other platforms. The licensing fee was set at 20% of the wholesale price of each cartridge sold (game cartridges wholesaled for around \$30). It typically cost \$500,000 and took around 6 months to develop a game. Nintendo insisted that games contain no excessively violent or sexually suggestive material, and they reviewed every game before allowing it to be produced.<sup>13</sup>

Despite these restrictions, six companies (Bandai, Capcom, Konami, Namco, Taito, and Hudson) agreed to become Nintendo licensees, not least because millions of customers were now clamoring for games. Bandai was Japan's largest toy company. The others already made either coin-operated videogames or computer software games. Because of these licensing agreements, they saw their sales and earnings surge. For example, Konami's earnings went from \$10 million in 1987 to \$300 million in 1991.

After the six licensees began selling games, reports of defective games began to reach Yamauchi. The original six licensees were allowed to manufacture their own game cartridges. Realizing that he had given away the ability to control the quality of the cartridges, Yamauchi decided to change the contract for future licensees. Future licensees were required to submit all manufacturing orders for cartridges to Nintendo. Nintendo charged licensees \$14 per cartridge, required that they place a minimum order for 10,000 units (later the minimum order was raised to 30,000), and insisted on cash payment in full when the order was placed. Nintendo outsourced all manufacturing to other companies, using the volume of its orders to get rock bottom prices. The cartridges were estimated to cost Nintendo between \$6 and \$8 each. The licensees then picked up the cartridges from Nintendo's loading dock and were responsible for distribution. In 1985, there were 17 licensees. By 1987, there were 50. By this point, 90% of the home videogame systems sold in Japan were Nintendo systems.

## Nintendo in America

In 1980, Nintendo established a subsidiary in America to sell its coin-operated videogames. Yamauchi's American-educated son-in-law, Minoru Arakawa,

headed the subsidiary. All of the other essential employees were Americans, including Ron Judy and Al Stone. For its first 2 years, Nintendo of America (NOA), based originally in Seattle, struggled to sell second-rate games such as Radarscope. The subsidiary seemed on the brink of closing. NOA could not even make the rent payment on the warehouse. Then they received a large shipment from Japan: 2,000 units of a new, coin-operated videogame. Opening the box, they discovered Donkey Kong. After playing the game briefly, Judy proclaimed it a disaster. Stone walked out of the building, declaring that "it's over."<sup>14</sup> The managers were appalled. They could not imagine a game less likely to sell in video arcades. The only promising sign was that a 20-year employee, Howard Philips, rapidly became enthralled with the machine.

Arakawa, however, knew he had little choice but to try to sell the machine. Judy persuaded the owner of the Spot Tavern near Nintendo's office to take one of the machines on a trial basis. After one night, Judy discovered \$30 in the coin box, a phenomenal amount. The next night there was \$35, and \$36 the night after that. NOA had a hit on its hands.

By the end of 1982, NOA had sold over 60,000 copies of Donkey Kong and had booked sales in excess of \$100 million. The subsidiary had outgrown its Seattle location. They moved to a new site in Redmond, a Seattle suburb, where they located next to a small but fast-growing software company run by an old school acquaintance of Howard Philips, Bill Gates.

By 1984, NOA was riding a wave of success in the coin-operated videogame market. Arakawa, however, was interested in the possibilities of selling Nintendo's new Famicom system in the United States. Throughout 1984, Arakawa, Judy, and Stone met with numerous toy and department store representatives to discuss the possibilities, only to be repeatedly rebuffed. Still smarting from the 1983 debacle, the representatives wanted nothing to do with the home videogame business. They also met with former managers from Atari and Caloco to gain their insights. The most common response they received was that the market had collapsed because the last generation of games were awful.

Arakawa and his team decided that if they were going to sell Famicom in the United States, they would have to find a new distribution channel. The obvious choice was consumer electronics stores.

Thus, Arakawa asked the R&D team in Kyoto to re-design Famicom for the U.S. market so that it looked less like a toy (Famicom was encased in red and white plastic), and more like a consumer electronics device. The redesigned machine was renamed the Nintendo Entertainment System (NES).

Arakawa's big fear was that illegal, low-quality Taiwanese games would flood the U.S. market if NES was successful. To stop counterfeit games being played on NES, Arakawa asked Nintendo's Japanese engineers to design a security system into the U.S. version of Famicom so that only Nintendo-approved games could be played on NES. The Japanese engineers responded by designing a security chip to be embedded in the game cartridges. NES would not work unless the security chips in the cartridges unlocked—or “shook hands with”—a chip in NES. Since the code embedded in the security chip was proprietary, the implication of this system was that no one could manufacture games for NES without Nintendo's specific approval.

To overcome the skepticism and reluctance of retailers to stock a home videogame system, Arakawa decided in late 1985 to make an extraordinary commitment. Nintendo would stock stores and set up displays and windows. Retailers would not have to pay for anything they stocked for 90 days. After that, retailers could pay Nintendo for what they sold and return the rest. NES was bundled with Nintendo's bestselling game in Japan, *Super Mario Brothers*. It was essentially a risk-free proposition for retailers, but even with this, most were skeptical. Ultimately, 30 Nintendo personnel descended on the New York City area. Referred to as the Nintendo SWAT team, they persuaded some stores to stock NES after an extraordinary blitz that involved 18-hour days. To support this product launch, Nintendo committed itself to a \$5-million advertising campaign aimed at the 7- to 14-year-old boys who seemed to be Nintendo's likely core audience.

By December 1985, between 500 and 600 stores in the New York City area were stocking Nintendo systems. Sales were moderate—about half of the 100,000 NES machines shipped from Japan were sold—but enough to justify going forward. The SWAT team then moved to Los Angeles, then Chicago, then Dallas. As in New York, sales started at a moderate pace but, by late 1986, they started to accelerate rapidly and Nintendo went national with NES.

In 1986, around 1 million NES units were sold in the United States. In 1987, the figure increased to 3 million. In 1988, it jumped to over 7 million. In the same year, 33 million game cartridges were sold. Nintendo mania had arrived in the United States. To expand the supply of games, Nintendo licensed the rights to produce up to five games per year to 31 American software companies. Nintendo continued to use a restrictive licensing agreement that gave it exclusive rights to any games, required licensees to place their orders through Nintendo, and insisted on a 30,000-unit minimum order.<sup>15</sup>

By 1990, the home videogame market was worth \$5 billion worldwide. Nintendo dominated the industry, with a 90% share of the market for game equipment. The parent company was, by some measures, now the most profitable company in Japan. By 1992, it was netting over \$1 billion in gross profit annually, or more than \$1.5 million for each employee in Japan. The company's stock market value exceeded that of Sony, Japan's premier consumer electronics firm. Indeed, the company's net profit exceeded that of all the American movie studios combined. Nintendo games, it seemed, were bigger than the movies.

As of 1991, there were over 100 licensees for Nintendo, and over 450 titles were available for NES. In the United States, Nintendo products were distributed through toy stores (30% of volume), mass merchandisers (40% of volume), and department stores (10% of volume). Nintendo tightly controlled the number of game titles and games that could be sold, quickly withdrawing titles as soon as interest appeared to decline. In 1988, retailers requested 110 million cartridges from Nintendo. Market surveys suggested that perhaps 45 million could have been sold, but Nintendo allowed only 33 million to be shipped.<sup>16</sup> Nintendo claimed that the shortage of games was in part due to a worldwide shortage of semiconductor chips.

Several companies had tried to reverse-engineer the code embedded in Nintendo's security chip, which competitors characterized as a lockout chip. Nintendo successfully sued them. The most notable was Atari Games, one of the successors of the original Atari, which in 1987 sued Nintendo of America for anti-competitive behavior. Atari claimed that the purpose of the security chip was to monopolize the market. At the same time, Atari announced that it had found a way around Nintendo's security chip and would begin to sell unlicensed games.<sup>17</sup> NOA responded with

a countersuit. In a March 1991 ruling, Atari was found to have obtained Nintendo's security code illegally and was ordered to stop selling NES-compatible games. However, Nintendo did not always have it all its own way. In 1990, under pressure from Congress, the Department of Justice, and several lawsuits, Nintendo rescinded its exclusivity requirements, freeing up developers to write games for other platforms. However, developers faced a real problem: What platform could they write for?

## SEGA'S SONIC BOOM

Back in 1954, David Rosen, a 20-year-old American, left the U.S. Air Force after a tour of duty in Tokyo.<sup>18</sup> Rosen had noticed Japanese citizens needed many photographs for ID cards, but that local photo studios were slow and expensive. He formed Rosen Enterprises and went into the photo-booth business, which was a big success. By 1957, Rosen had established a successful, nationwide chain. At this point, the Japanese economy was booming, so Rosen decided it was time to get into another business—entertainment. As his vehicle, he chose arcade games, which were unknown in Japan at the time. He picked up used games on the cheap from America and set up arcades in the same Japanese department stores and theaters that typically housed his photo booths. Within a few years, Rosen had 200 arcades nationwide. His only competition came from another American-owned firm, Service Games (Sega), whose original business was jukeboxes and fruit machines.

By the early 1960s, the Japanese arcade market had caught up with the U.S. market. The problem was that game makers had run out of exciting new games to offer. Rosen decided that he would have to get into the business of designing and manufacturing games, but to do that he needed manufacturing facilities. Sega manufactured its own games, so in 1965 Rosen approached the company and suggested a merger. The result was Sega Enterprises, a Japanese company with Rosen as its CEO.

Rosen himself designed Sega's first game, *Periscope*, in which the objective was to sink chain-mounted cardboard ships by firing torpedoes, represented by lines of colored lights. *Periscope* was a big success not only in Japan, but also in the United States and Europe, and it allowed Sega to build up a

respectable export business. Over the years, the company continued to invest heavily in game development, always using the latest electronic technology.

Gulf and Western, a U.S. conglomerate, acquired Sega in 1969, with Rosen running the subsidiary. In 1975, Gulf and Western (G&W) took Sega public in the United States, but left Sega Japan as a G&W subsidiary. Hayao Nakayama, a former Sega distributor, was drafted as president. In the early 1980s, Nakayama pushed G&W to invest more in Sega Japan so that the company could enter the then-booming home videogame market. When G&W refused, Nakayama suggested a management buyout. G&W agreed and, in 1984, for the price of just \$38 million, Sega became a Japanese company once more. (Sega's Japanese revenues were around \$700 million, but by now the company was barely profitable.)

Sega was caught off guard by the huge success of Nintendo's Famicom. Although it released its own 8-bit system in 1986, the machine never commanded more than 5% of the Japanese market. Nakayama, however, was not about to give up. From years in the arcade business, he understood that great games drove sales. Nevertheless, he also understood that more powerful technology gave game developers the tools to develop more appealing games. This philosophy underlay Nakayama's decision to develop a 16-bit game system, Genesis.

Sega took the design of its 16-bit arcade machine and adapted it for Genesis. Compared to Nintendo's 8-bit machine, the 16-bit machine featured an array of superior technological features, including high-definition graphics and animation, a full spectrum of colors, two independent, scrolling backgrounds that created an impressive depth of field, and near-CD quality sound. The design strategy also made it easy to port Sega's catalog of arcade hits to Genesis.

Genesis was launched in Japan in 1989, and in the United States in 1990. In the United States, the machine was priced at \$199. The company hoped that sales would be boosted by the popularity of its arcade games, such as the graphically violent *Altered Beast*. Sega also licensed other companies to develop games for the Genesis platform. In an effort to recruit licensees, Sega asked for lower royalty rates than Nintendo, and it gave licensees the right to manufacture their own cartridges. Independent game developers were slow to climb on board, however, and the \$200 price tag for the player held back sales.

One of the first independent game developers to sign up with Sega was Electronic Arts. Established by Trip Hawkins, Electronic Arts had focused on designing games for PCs and consequently had missed the Nintendo 8-bit era. Now Hawkins was determined to get a presence in the home videogame market, and aligning his company with Sega seemed to be the best option. The Nintendo playing field was already crowded, and Sega offered a far less restrictive licensing deal than Nintendo. Electronic Arts subsequently wrote several popular games for Genesis, including John Madden Football and several gory combat games.<sup>19</sup>

Nintendo had not been ignoring the potential of its 16-bit system, Super NES, which was ready for market introduction in 1989—at the same time as Sega’s Genesis. Nintendo introduced Super NES in Japan in 1990, where it quickly established a strong market presence and beat Sega’s Genesis. In the United States, however, the company decided to hold back longer to reap the full benefits of the dominance it enjoyed with the 8-bit NES system. Yamauchi was also worried about the lack of backward compatibility between Nintendo’s 8-bit and 16-bit systems. (The company had tried to make the 16-bit system so that it could play 8-bit games, but concluded that the cost of doing so was prohibitive.) These concerns may have led the company to delay market introduction until the 8-bit market was saturated.

Meanwhile, in the United States, the Sega bandwagon was beginning to gain momentum. One development that gave Genesis a push was the introduction of a new Sega game, Sonic the Hedgehog. Developed by an independent team that was contracted to Sega, the game featured a cute hedgehog that impatiently tapped his paw when the player took too long to act. Impatience was Sonic’s central feature—he had places to go, and quickly. He zipped along, collecting brass rings when he could find them, before rolling into a ball and flying down slides with loops and underground tunnels. Sonic was Sega’s Mario.

In mid-1991, in an attempt to jump-start slow sales, Tom Kalinske, head of Sega’s American subsidiary, decided to bundle Sonic the Hedgehog with the game player. He also reduced the price for the bundled unit to \$150 and relaunched the system with an aggressive advertising campaign aimed at teenagers. The campaign was built around the slogan “Genesis does what Nintendon’t.” The shift in strategy worked, and sales accelerated sharply.

Sega’s success prompted Nintendo to launch its 16-bit system, Super NES, at \$200. However, Sega now had a 2-year head start in games. By the end of 1991, about 125 game titles were available for Genesis, compared to 25 for Super NES. In May 1992, Nintendo reduced the price of Super NES to \$150. At this time, Sega was claiming a 63% share of the 16-bit market in the United States, and Nintendo claimed a 60% share. By now, Sega was cool. It began to take more chances with mass-media-defined morality. When Acclaim Entertainment released its bloody *Mortal Kombat* game in September 1992, the Sega version let players rip off heads and tear out hearts. Reflecting Nintendo’s image of their core market, its version was sanitized. The Sega version outsold Nintendo’s two to one.<sup>20</sup> Therefore, the momentum continued to run in Sega’s favor. By January 1993, there were 320 titles available for Sega Genesis, and 130 for Super NES. In early 1994, independent estimates suggested that Sega had 60% of the U.S. market and Nintendo had 40%, figures Nintendo disputed.



Trip Hawkins, whose first big success was Electronic Arts, founded 3DO in 1991.<sup>21</sup> Hawkins’s vision for 3DO was to shift the home videogame business away from the existing cartridge-based format and toward a CD-ROM-based platform. The original partners in 3DO were Electronic Arts, Matsushita, Time Warner, AT&T, and the venture-capital firm Kleiner Perkins. Collectively they invested over \$17 million in 3DO, making it the richest start-up in the history of the home videogame industry. 3DO went public in May 1993 at \$15 per share. By October of that year, the stock had risen to \$48 per share, making 3DO worth \$1 billion—not bad for a company that had yet to generate a single dollar in revenues.

The bases for 3DO’s \$1-billion market cap were its patented computer system architecture and a copyrighted operating system that allowed for much richer graphics and audio capabilities. The system was built around a 32-bit, RISC microprocessor and proprietary graphics processor chips. Instead of a cartridge, the 3DO system stored games on a CD-ROM that was capable of holding up to 600 megabytes of content, sharply up from the 10 megabytes of content found

in the typical game cartridge of the time. The slower access time of a CD-ROM compared to a cartridge was alleviated somewhat by the use of a double-speed CD-ROM drive.<sup>22</sup>

The belief at 3DO—a belief apparently shared by many investors—was that the superior storage and graphics-processing capabilities of the 3DO system would prove very attractive to game developers, allowing them to be far more creative. In turn, better games would attract customers away from Nintendo and Sega. Developing games that used the capabilities of a CD-ROM system altered the economics of game development. Estimates suggested that it would cost approximately \$2 million to produce a game for the 3DO system and could take as long as 24 months to develop. However, at \$2 per disc, a CD-ROM cost substantially less to manufacture than a cartridge.

The centerpiece of 3DO's strategy was to license its hardware technology for free. Game developers paid a royalty of \$3 per disc for access to the 3DO operating code. Discs typically retailed for \$40 each.

Matsushita introduced the first 3DO machine into the U.S. market in October 1993. Priced at \$700, the machine was sold through electronic retailers that carried Panasonic high-end electronics products. Sega's Tom Kalinsky noted, "It's a noble effort. Some people will buy 3DO, and they'll have a wonderful experience. It's impressive, but it's a niche. We've done the research. It does not become a large market until you go below \$500. At \$300, it starts to get interesting. We make no money on hardware. It's a cutthroat business. I hope Matsushita understands that."<sup>23</sup> CD-ROM discs for the 3DO machine retailed for around \$75. The machine came bundled with *Crash n Burn*, a high-speed, combat racing game. However, only 18 3DO titles were available by the crucial Christmas period, although reports suggested that 150 titles were under development.<sup>24</sup>

Sales of the hardware were slow, reaching only 30,000 by January 1994.<sup>25</sup> In the same month, AT&T and Sanyo both announced that they would begin to manufacture the 3DO machine. In March, faced with continuing sluggish sales, 3DO announced that it would give hardware manufacturers two shares of 3DO stock for every unit sold at or below a certain retail price. Matsushita dropped the price of its machine to \$500. About the same time, Toshiba, LG, and Samsung all announced that they would start to produce 3DO machines.

By June 1994, cumulative sales of 3DO machines in the United States stood at 40,000 units. Matsushita announced plans to expand distribution beyond the current 3,500 outlets to include the toy and mass-merchandise channels. Hawkins and his partners announced that they would invest another \$37 million in 3DO. By July, there were 750 3DO software licensees, but only 40 titles were available for the format. Despite these moves, sales continued at a very sluggish pace, and the supply of new titles started to dry up.<sup>26</sup>

In September 1996, 3DO announced that it would either sell its hardware system business or move it into a joint venture.<sup>27</sup> The company announced that some 150 people, one-third of the work force, would probably lose their jobs in the restructuring. According to Hawkins, 3DO would now focus on developing software for online gaming. Hawkins stated that the Internet and Internet entertainment constituted a huge opportunity for 3DO. The stock dropped \$1.375, to \$6.75.

## SONY PLAYSTATION

In Fall 1995, Sony entered the fray with the introduction of its PlayStation.<sup>28</sup> PlayStation used a 32-bit, RISC microprocessor running at 33 MHz and using a double-speed CD-ROM drive. PlayStation cost an estimated \$500 million to develop. The machine had actually been under development since 1991, when Sony decided that the home videogame industry was getting too big to ignore. Initially, Sony was in an alliance with Nintendo to develop the machine. Nintendo walked away from the alliance in 1992, however, after a disagreement over who owned the rights to future CD-ROM games. Sony moved forward alone.<sup>29</sup>

A consumer electronics giant with a position in the Hollywood movie business and the music industry (Sony owned Columbia Pictures and the Columbia record label), Sony believed from the start that it had access to significant intellectual property that could form the basis of many popular games.

In 1991, Sony established a division in New York: Sony Electronic Publishing. The division was to serve as an umbrella organization for Sony's multimedia offerings. Headed by Iceland native Olaf Olafsson, then just 28 years old, this organization ultimately took the lead role in both the market launch of PlayStation

and in developing game titles.<sup>30</sup> In 1993, as part of this effort, Sony purchased a well-respected British game developer, Psygnosis. By Fall 1995, this unit had 20 games ready to complement PlayStation: *The Haldeman Diaries*, *Mickey Mania* (developed in collaboration with Disney), and *Johnny Mnemonic*, based on the William Gibson short story. To entice independent game developers such as Electronic Arts, Namco, and Acclaim Entertainment, Olafsson used the promise of low royalty rates. The standard royalty rate was set at \$9 per disc, although developers that signed on early enough were given a lower royalty rate. Sony also provided approximately 4,000 game development tools to licensees in an effort to help them speed games to market.<sup>31</sup>

To distribute PlayStation, Sony set up a retail channel separate from Sony's consumer electronics sales force. It marketed the PlayStation as a hip, powerful alternative to the outdated Nintendo and Sega cartridge-based systems. Sony worked closely with retailers before the launch to determine how it could help them sell the PlayStation. To jump-start demand, Sony set up in-store displays to allow potential consumers to try the equipment. Just before the launch, Sony had lined up an impressive 12,000 retail outlets in the United States.<sup>32</sup>

Sony targeted its advertising for PlayStation at males in the 18 to 35 age range. The targeting was evident in the content of many games. One big hit for PlayStation was *Tomb Raider*, whose central character, Lara Croft, combined sex appeal and savvy and helped to recruit an older generation to PlayStation.<sup>33</sup> PlayStation was initially priced at \$299, and games retailed for as much as \$60. Sony's Tokyo-based executives had reportedly been insisting on a \$350–\$400 price for PlayStation, but Olafsson pushed hard for the lower price. Because of the fallout from this internal battle, in January 1996, Olafsson resigned from Sony. By then, however, Sony was following Olafsson's script.<sup>34</sup>

Sony's prelaunch work was rewarded with strong early sales. By January 1996, more than 800,000 PlayStations had been sold in the United States, plus another 4 million games. In May 1996, with 1.2 million PlayStations shipped, Sony reduced the price of PlayStation to \$199. Sega responded with a similar price cut for its Saturn. The prices on some of Sony's initial games were also reduced to \$29.99. The weekend after the price cuts, retailers reported that PlayStation

sales were up by between 350 and 1,000% over the prior week.<sup>35</sup> The sales surge continued through 1996. By the end of the year, sales of PlayStation and associated software amounted to \$1.3 billion, out of a total for U.S. sales at \$2.2 billion for all videogame hardware and software. In March 1997, Sony cut the price of PlayStation again, this time to \$149. It also reduced its suggested retail price for games by \$10 to \$49.99. By this point, Sony had sold 3.4 million units of PlayStation in the United States, compared to Saturn's 1.6 million units.<sup>36</sup> Worldwide, PlayStation had outsold Saturn by 13 million to 7.8 million units, and Saturn sales were slowing.<sup>37</sup> The momentum was clearly running in Sony's favor, but the company now had a new challenge to deal with: Nintendo's latest generation game machine, the N64.

## NINTENDO STRIKES BACK

In July 1996, Nintendo launched Nintendo 64 (N64) in the Japanese market. This release was followed by a late Fall introduction in the United States. N64 is a 64-bit machine developed in conjunction with Silicon Graphics. Originally targeted for introduction a year earlier, N64 had been under development since 1993. The machine used a plug-in cartridge format rather than a CD-ROM drive. According to Nintendo, cartridges allow for faster access time and are far more durable than CD-ROMs (an important consideration with children).<sup>38</sup>

The most striking feature of the N64 machine, however, was its 3D graphics capability. N64 provides fully rounded figures that can turn on their heels and rotate through 180 degrees. Advanced ray-tracing techniques borrowed from military simulators and engineering workstations added to the sense of realism by providing proper highlighting, reflections, and shadows.

N64 was targeted at children and young teenagers. It was priced at \$200 and launched with just four games. Despite the lack of games, initial sales were very strong. Indeed, 1997 turned out to be a banner year for both Sony and Nintendo. The overall U.S. market was strong, with sales of hardware and software combined reaching a record \$5.5 billion. Estimates suggest that PlayStation accounted for 49% of machines and games by value. N64 captured a 41%

share, leaving Sega trailing badly with less than 10% of the market. During the year, the average price for game machines had fallen to \$150. By year-end there were 300 titles available for PlayStation, compared to 40 for N64. Games for PlayStation retailed for \$40, on average, compared to over \$60 for N64.<sup>39</sup>

By late 1998, PlayStation was widening its lead over N64. In the crucial North American market, PlayStation was reported to be outselling N64 by a two-to-one margin, although Nintendo retained a lead in the under-12 category. At this point, there were 115 games available for N64 versus 431 for PlayStation.<sup>40</sup> Worldwide, Sony had now sold close to 55 million PlayStations. The success of PlayStation had a major impact on Sony's bottom line. In fiscal 1998, PlayStation business generated revenues of \$5.5 billion for Sony, 10% of its worldwide revenues, but accounted for \$886 million, or 22.5%, of the company's operating income.<sup>41</sup>

## THE 128-BIT ERA

When Nintendo launched its 64-bit machine in 1996, Sony and Sega didn't follow, preferring instead to focus on the development of even more powerful 128-bit machines.

Sega was the first to market a 128-bit console, which it launched in Japan in late 1998 and in the United States in late 1999. The Dreamcast came equipped with a 56-kilobit modem to allow for online gaming over the Internet. By late 2000, Sega had sold around 6 million Dreamcasts worldwide, accounting for about 15% of console sales since its launch. Sega nurtured Dreamcast sales by courting outside software developers who helped develop new games, including *Crazy Taxi*, *Resident Evil*, and *Quake III Arena*. The company had a goal of shipping 10 million units by March 2001—a goal it never reached.<sup>42</sup>

Despite its position as first mover with a 128-bit machine, and despite solid technical reviews, by late 2000 the company was struggling. Sega was handicapped first by product shortages due to constraints on the supply of component parts, and then by a lack of demand as consumers waited to see whether Sony's 128-bit offering, the much-anticipated PlayStation 2 (PS2), would be a more attractive machine. In September 2000, Sega responded to the impending

U.S. launch of Sony's PS2 by cutting the price for its console from \$199 to \$149. In late October, Sega announced that, due to this price cut, it would probably lose over \$200 million in the fiscal year ending March 2001.<sup>43</sup>

## Sony's PlayStation 2

PlayStation 2 was launched in Japan in mid-2000 and in the United States at the end of October 2000. Initially priced at \$299, PlayStation 2 was a powerful machine. At its core was a 300-megahertz graphics-processing chip that was jointly developed with Toshiba and consumed about \$1.3 billion in R&D. Referred to as the Emotion Engine processor, the chip allowed the machine to display stunning graphic images previously found only on supercomputers. The chip made the PlayStation 2 the most powerful videogame machine yet.

It was designed play different CD and DVD formats, as well as proprietary game titles. As was true with the original PlayStation, PlayStation 2 could play audio CDs. The system was also compatible with the original PlayStation; any PlayStation title could be played on the PlayStation 2. To help justify the initial price tag, the unit doubled as a DVD player with picture quality as good as dedicated players. PlayStation 2 did not come equipped with a modem, but it had networking capabilities, and a modem could be attached using one of two USB ports.<sup>44</sup>

## Nintendo GameCube

Nintendo had garnered a solid position in the industry with its N64 machine by focusing on its core demographic, 7- to 12-year-olds. In 1999, Nintendo took 33% of the hardware market and 28% of the game market. Nintendo's next-generation videogame machine, GameCube, packed a modem and a powerful, 400-megahertz, 128-bit processor made by IBM into a compact cube. GameCube marked a shift away from Nintendo's traditional approach of using proprietary cartridges to hold game software. Instead, software for the new player came on 8-centimeter CDs, which are smaller than music compact disks. The disks held 1.5 gigabytes of data each—far greater storage capacity than the old game cartridges. Players could control GameCube using wireless controllers.<sup>45</sup>

Nintendo tried to make the GameCube easy for developers to work with rather than focusing on raw peak performance. While developers no doubt appreciated this, by the time GameCube hits store shelves in late 2001, PlayStation 2 had been on the market for eighteen months and boasted a solid library of games. Despite its strong brand and instantly recognized intellectual property, which included Donkey Kong, Super Mario Brothers, and the Pokemon characters, Nintendo was playing catch up to Sony. Moreover, another new entrant into the industry—Microsoft—launched its 128-bit offering at around the same time.

## Microsoft Xbox

Microsoft was first rumored to be developing a videogame console in late 1999. In March 2000, Bill Gates made it official when he announced that Microsoft would enter the home videogame market in fall 2001 with a console code named Xbox. In terms of sheer computing power, the 128-bit Xbox had the edge over competitors. Xbox had a 733-megahertz Pentium III processor, a high-powered graphics chip from Nvidia Corp, a built-in broadband cable modem to allow for online game playing and high-speed Internet browsing, 64 megabytes of memory, CD and DVD drives, and an internal hard disk drive. The operating system was a stripped-down version of Microsoft's popular Windows system optimized for graphics-processing capabilities. Microsoft claimed that because the Xbox was based on familiar PC technology, it would be much easier for software developers to write games for, and it would be relatively easy to convert games from the PC to run on the Xbox.<sup>46</sup>

Although Microsoft was a new entrant to the videogame industry, it was no stranger to games. Microsoft had long participated in the PC gaming industry and was one of the largest publishers of PC games, with hits such as Microsoft Flight Simulator and Age of Empires I and II to its credit. Sales of Microsoft's PC games increased 50% annually between 1998 and 2001, and the company controlled about 10% of the PC game market in 2001. Microsoft had also offered online gaming for some time, including its popular MSN Gaming Zone site. Started in 1996, by 2001 the website had become the largest online PC gaming hub on the Internet, with nearly 12 million subscribers paying \$9.95 a month to play premium games such as Asheron's Call or Fighter

Ace. Nor was Microsoft new to hardware; its joysticks and game pads outsold all other brands, and it had an important mouse business.

To build the Xbox, Microsoft chose Flextronics, a contract manufacturer that already made computer mice for Microsoft. Realizing that it would probably have to cut Xbox prices over time, Microsoft guaranteed Flextronics a profit margin, effectively agreeing to subsidize Flextronics if selling prices fell below a specified amount. By 2003, Microsoft was thought to be losing \$100 on every Xbox sold. To make that back and turn a profit, Microsoft reportedly had to sell between six and nine videogames per Xbox.<sup>47</sup>

Analysts speculated that Microsoft's entry into the home videogame market was a response to a potential threat from Sony. Microsoft was worried that Internet-ready consoles like PlayStation 2 might take over many Web-browsing functions from the personal computer. Some in the company described Internet-enabled videogame terminals as Trojan horses in the living room. In Microsoft's calculation, it made sense to get in the market to try to keep Sony and others in check. With annual revenues in excess of \$20 billion worldwide, the huge home videogame market was an important source of potential growth for Microsoft. Still, by moving away from its core market, Microsoft was taking a big risk, particularly given the scale of investments required to develop the Xbox, reported to run as high as \$1.5 billion.

## Mortal Combat: Microsoft Versus Sony

The launch of Xbox and Game Cube helped propel sales of videogame hardware and software to a record \$9.4 billion in 2001, up from \$6.58 billion in 2000. Although both Xbox and Nintendo initially racked up strong sales, the momentum slowed significantly in 2002. Microsoft in particular, found it very difficult to penetrate the Japanese market. By September 2002, Sony had sold 11.2 million units of PS2 in the United States, versus 2.2 million units of Xbox and 2.7 million units of Nintendo's game Cube. Unable to hold onto market share in the wake of the new competition, Sega withdrew from the console market, announcing that henceforth it would focus on developing games for other platforms.

In June 2002, Sony responded to the new entry by cutting the price for PS2 from \$299 to \$199. Microsoft quickly followed, cutting the price for Xbox from

\$299 to \$199, while Nintendo cut its price from \$299 to \$149.<sup>48</sup> A year later, Sony cut prices again, this time to \$179. Microsoft followed with a similar price cut and, in March 2004, it took the lead, cutting Xbox prices to \$149. Sony followed suit two months later.<sup>49</sup>

Microsoft's strategy, however, involved far more than just cutting prices. In November 2002, Microsoft announced that it would introduce a new service for gamers, Xbox Live. For \$50 a year, Xbox Live subscribers with broadband connections would be able to play online enabled versions of Xbox games with other online subscribers. To support Xbox Live, Microsoft invested some \$500 million in its own data centers to host online game playing.

Online game playing was clearly a strategic priority from the outset. Unlike the PS2 and Game Cube, Xbox came with built-in broadband capability. The decision to make the Xbox broadband capable had been made in 1999, when less than 5% of U.S. homes were linked to the Internet with a broadband connection. Explaining the decision to build broadband capabilities into the Xbox at a time when rivals lacked them, the head of Xbox, Jay Allard, noted that "my attitude has always been to bet on the future, not against it."<sup>50</sup> While Sony's PS2 can be hooked up to the Internet via a broadband connection, doing so requires purchase of a special network adapter for \$40.

By mid-2003, Xbox live had some 500,000 subscribers, versus 80,000 who had registered to play PlayStation 2 games online. By this point in time, there were 28 online games for Xbox, and 18 for PS2. By January 2004, the comparative figures stood at 50 for Microsoft and 32 for Sony. By mid-2004, Xbox live reportedly had over 1 million subscribers, with Sony claiming a similar number of online players.<sup>51</sup> In May 2004, Microsoft struck a deal with Electronic Arts, the world's largest video game publisher, to bring EA games, including its bestselling John Madden Football, to the Xbox live platform. Until this point, EA had only produced live games for Sony's platform.

In spite of these strategic moves, by late 2004, Xbox was still a distant second of PS2 in the videogame market, having sold 14 million consoles against Sony's 70 million (Nintendo had sold 13 million Game Cube consoles by this point). While Sony was making good money from the business, Microsoft was registering significant losses. In fiscal 2004, Microsoft's home and entertainment division, of which Xbox is the major component, registered \$2.45 billion in

revenues but lost \$1.135 billion. By way of contrast, Sony's game division had \$7.5 billion of sales in fiscal 2004 and generated operating profits of \$640 million.

Microsoft, however, indicated that it was in the business for the long term. In late 2004, the company got a boost from the release of Halo 2, the sequel to Halo, one of its bestselling games. As first-day sales for Halo 2 were tallied, executives at Sony had to be worried. Microsoft announced that Halo 2 had sales of \$125 million in its first 24 hours on the market in the United States and Canada, an industry record. These figures represented sales of 2.38 million units, and put Halo 2 firmly on track to be one of the biggest video games ever, with a shot at surpassing Nintendo's Super Mario 64, which had sold \$308 million in the United States since its September 1996 debut. Moreover, the company was rumored to be ahead of Sony by as much as a year to bring the next-generation video game console to market. In late 2004, reports suggested that Xbox 2 would be on the market in time for the 2005 Christmas season, probably a full year ahead of Sony's PlayStation 3. Sony was rumored to be running into technical problems as it tried to develop PlayStation 3.<sup>52</sup>

## THE NEXT GENERATION

As the battle between PS2 and Xbox drew to a close, it was clear that Sony was the big winner. From 2001 through Fall 2006, when PlayStation 3 (PS3) hit the market, Sony had sold around 110 million PS2 consoles, versus 25 million for Microsoft's Xbox and 21 million for Nintendo's Game Cube.<sup>53</sup> Sony's advantage translated into a huge lead in number of games sold—some 1.08 billion for PS2 by mid-2006, versus 200 million for the Xbox.<sup>54</sup> With the console companies reportedly making an average royalty on third-party software of \$8 per game sold, the financial implications of Sony's lead with PS2 are obvious.<sup>55</sup> Indeed, in 2005, Sony's games division contributed to 6.24% of the company's total revenue, but 38% of operating profit. In contrast, Microsoft's home and entertainment division lost \$4 billion between the launch of Xbox and mid-2006.

However, by 2006, this was all history. In November 2005, Microsoft introduced its next-generation machine, Xbox 360, beating Sony and Nintendo to

the market by a solid year. The Xbox 360 represented a big technological advance over the original Xbox. To deliver improved picture quality, the Xbox 360 could execute 500 million polygons/sec—a four-fold increase over the Xbox. The main microprocessor was 13 times faster than the chip in the Xbox. Xbox 360 had 512 megabytes of memory, an eight-fold increase, and a 20-gigabyte hard drive, 2.5 times bigger than that found on the Xbox. Xbox 360 is, of course, enabled for a broadband connection to the Internet.

The machine itself was made by Flextronics and Wistron, two contract manufacturers (a third started production after launch). Priced at \$299, Xbox 360 was sold at a loss. The cost of making Xbox 360 was estimated to be as high as \$500 at launch, falling to \$350 by late 2006. Microsoft's goal was to ultimately break even on sales of the hardware as manufacturing efficiencies drove down unit costs.

To seed the market with games, Microsoft took a number of steps. Taking a page out of its Windows business, Microsoft provided game developers with tools designed to automate many of the key software programming tasks and reduce development time and costs. The company had also expanded its own in-house game studios, in part by purchasing several independent game developers including Bungie Studios, makers of Halo. This strategy enabled Microsoft to offer exclusive content for the Xbox 360, something that third-party developers were reluctant to do.

With the costs of game development increasing to between \$10 and \$15 million for more complex games, and development time stretching out to between 24 and 36 months, Microsoft also had to provide an inducement to get third-party developers onboard. Although details of royalty terms are kept private, it is believed that Microsoft offered very low royalty rates, and perhaps even zero royalties, for a specified period of time to game developers who committed early to Xbox 360. One of those to commit early was Electronic Arts, the leading independent game development company, which reportedly budgeted as much as \$200 million to develop some 25 versions of its bestselling games, such as its sports games, for Xbox 360. Microsoft budgeted a similar amount to develop games on its own.<sup>56</sup>

Some 18 games were available for the November 2005 launch of Xbox 360, and by the end of 2006, this figure had increased to around 160. Halo 3, which was expected to be one of the biggest games for Xbox

360, was released in September 2007. Exclusive to the Xbox 360, Halo 3 racked in first-day sales of \$170 million, which was an industry record. Grand Theft Auto 4, the most popular franchise on PS2, was also launched simultaneously for both Xbox 360 and PS3 in 2007—a major coup for Microsoft.

The initial launch of Xbox 360 was marred by shortages of key components, which limited the number of machines that Microsoft could bring to market. Had Sony been on time with its launch of PS3, this could have been a serious error, but in the event Sony delayed its launch of PS3, first until Spring of 2006, and then November 2006. By the time Sony launched PS3 in November 2006, some 6 million Xbox 360 consoles had been sold, and Microsoft was predicting sales of 10 million by the end of 2006.

As with Xbox, Microsoft is pushing Xbox Live with Xbox 360. The company invested as much as \$1 billion in Live from its inception. By late 2006, Microsoft was claiming that some 60% of Xbox 360 customers had also signed on for Xbox Live, and that the service had 4 million subscribers. By early 2008, there were over 10 million subscribers. Xbox Live allows gamers to play against each other online, and to download digital content from the Xbox Live Marketplace. Looking forward, there is little doubt that Microsoft sees Xbox Live as a critical element of its strategy, enabling Xbox owners to download any digital content—games, film, music—onto their consoles, which could become the hub of a home digital entertainment system.

The business model for Xbox 360 depends upon the number of games sold per console, the percentage of console owners who sign up for Xbox Live, sales of hardware accessories (e.g., controllers, an HD-DVD drive, wireless networking adapter), and the console itself achieving break even production costs. Reports suggest that Microsoft will break even if each console owners buys 6 to 7 games and 2 or 3 accessories, and if some 10 million sign on to Xbox Live (Microsoft splits Xbox Live revenues with game developers). By the end of 2006, it was estimated that some 33 million games had been sold for Xbox 360.<sup>57</sup>

Sony finally introduced PS3 on November 11 in Japan, and on November 17 in the United States. The delay in the launch of PS3 was due to Sony's decision to bundle a Blu-ray drive with PS3, and to problems developing the "cell" processor that sits at the core of the PS3. Blu-ray is Sony's proprietary, high-definition DVD format. The company is currently locked in a

format war with Toshiba, which is pushing its rival HD-DVD format (which can be purchased as an accessory for the Xbox 360). Sony has argued that the combination of its cell processor and Blu-ray DVD drive will give PS3 a substantial performance edge over Xbox 360. While this is true in a technical sense (the Blu-ray discs have five times the storage capacity of the DVD discs for Xbox 360), few reviewers have noticed much in the way of difference from a game-playing perspective—perhaps because few games were initially available that showed the true power of the PS3.

What is certain is that incorporating Blu-ray drives in the PS3 has significantly raised the costs of the machine. Sony is selling its stand-alone Blu-ray drives for \$999, which suggests that the PS3, initially priced at between \$500 and \$600 depending upon configuration, is in a sense a subsidized Blu-ray player. Shortages of blue diodes, a critical component in high-definition DVD drives, also limited supply of the PS3 after its launch. Only 93,000 PS3 players were available for the Japanese launch. At launch, there were some 20 games available for the PS3. Sony also announced its own Live offering to compete with Xbox Live, and stated that it would be free to PS3 users.

Nintendo also got back in the fray. In November 2006, it launched its own next-generation offering, Wii. When developing the Wii, Nintendo made a number of interesting strategic decisions. First, they decided not to compete with Microsoft and Sony on graphics-processing power. Instead of developing a high-powered machine crammed full of expensive, custom-built components, they used off-the-shelf components to assemble a much cheaper machine that could be sold at a much lower price point (the initial price was \$250). While this machine did not offer the graphics-processing capabilities of Xbox 360 or PS3, the games were cheaper to develop, around \$5 million each as opposed to as much as \$20 million for the PS3. Second, Nintendo decided to target a new demographic, indifferent people who had no interest in video games, as opposed to the stereotypical game player. Nintendo already had some evidence that this market could be tapped, and that it was extremely lucrative. In 2004, Nintendo had introduced a game for its handheld player, the DS, that was aimed not at its core 7- to 12-year-old demographic, but a much wider market. The game, *Brain Age*, based on a brain training regime developed by a Japanese neuroscientist, was a huge hit in Japan, with sales of more than

12 million units. It made the DS a hit in such unlikely places as nursing homes. Third, rather than processing power, Nintendo decided to focus on developing a motion-sensitive, wireless controller that could detect arm and hand motions and transfer them to the screen. This enabled the development of interactive games, with players physically controlling the action on screen by moving their arms, whether by swinging an imaginary bat, driving a go kart, or slashing a sword through the air.<sup>58</sup>

By early 2007, it was clear that the Wii was turning into a surprise hit. The combination of low price, innovative design, and a portfolio of recognizable games based on Nintendo's long-established franchises such as Mario Brothers and Pokeman helped drive sales forward. Moreover, as planned, the Wii seemed to appeal to a broad range of age groups and to both genders. Soon, articles appeared explaining how retirement homes were buying the Wii so that residents could play virtual baseball with their visiting grandchildren, and sales started to accelerate.

By 2010, it was clear that the Wii had been the major success story of this generation of gaming consoles. Since their respective launches, the Wii had sold 74.5 million units, compared to 43.8 million for Xbox 360 and 38.7 million of PlayStation 3. Nintendo also had a strong lead in the popular handheld market, with 135 million units sold worldwide, compared to 60.5 million for the PSP, Sony's handheld game player (Microsoft did not have a handheld player).<sup>59</sup> On the other hand, a key to the success of a console is the number of games sold per box, and on this measure Xbox 360 had the best performance. After each console had been on the market for 29 months, Xbox had sold 7.5 games per box, compared to 6.5 for PlayStation and 6.2 for Nintendo. By October 2010, the ratio had risen to around 9.0 games per box for Xbox 360 (these figures are for the United States only).<sup>60</sup>

Total industry sales in the United States peaked in 2008 at \$22.11 billion, before declining to \$20.2 billion as the recession cut into demand (worldwide sales were \$54 billion in 2008). Despite the recession, all three players in the market were profitable on an operating basis in 2009 and 2010. Worldwide sales are expected to exceed \$60 billion in 2012. Both Microsoft and Sony had shot themselves in the foot with quality problems and component shortages early in the product cycle (Microsoft had to take a \$1.05-billion write-off in 2007 for replacing poor-quality consoles),

but were now performing well. Microsoft is predicting that this generation of console will last about 10 years, making it the longest generation ever.

Looking forward, any number of factors may change the industry. In November 2010, Microsoft released its response to Nintendo's motion sensor with a device known as Kinect. Kinect may fundamentally alter the way users interact with digital content. Kinect combines technologies such as body movement detection, facial recognition, and voice recognition, to let gamers use natural motions and voice to control games. The input device is a camera and depth sensor mounted on top of the TV. In essence, Kinect is a potentially revolutionary step forward in human-machine interface design that could have implications that go way beyond videogames. To start with, Microsoft will use Kinect to go after the casual gamers that flocked to the Nintendo Wii has. As always with a new game technology, the success of Kinect will hinge crucially upon the quality of the games available. While it will take some time until games utilize the full power of Kinect, the early sales figures bode well for the device. Between launch and the start of March 2011, Microsoft sold over 10 million Kinect devices, making it the fastest-selling consumer electronics device of all time.<sup>61</sup>

Online gaming continues to gain traction. Xbox Live has turned into a big hit for Microsoft, and now has some 25 million subscribers who use it for everything from playing multiplayer games to streaming movies from Netflix and browsing Facebook. It is estimated that about 50% of Xbox Live subscribers are paying Gold Member subscribers. In fiscal 2009 (which ended June 30, 2010), Microsoft generated over \$1.2 billion in revenues of Xbox Live subscriptions and services. This seems to be a growth engine going forward. Microsoft has announced the Xbox Live will be fully integrated into Windows 8, the next version of its Windows operating system now under development.

Interestingly enough, the largest multiplayer online game has no connection with any of the console platforms. This is World of Warcraft, the massive, multiplayer, online game with 12 million paying subscribers and annual revenues in excess of \$1.2 billion—the bestselling game of all time.

*This case is intended to be used as a basis for class discussion rather than as an illustration of either effective or ineffective handling of the situation. Reprinted by permission of Charles W. L. Hill.*

## NOTES

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