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UTAH TECHNOLOGY REPORT

V I D E O G A M E S



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EXECUTIVE SUMMARY

The video game industry has never looked back since its creation in 1961, except for a small downturn due to a saturated market in the early 1980's. But the downturn was reversed and the industry was revitalized largely due to the Nintendo Entertainment System (NES) that brought revolutionary new game play and graphics to game players in 1986. At the time Nintendo entered the market the industry was spotted with many mildly successful companies. No one enjoyed large market share and Atari was rapidly falling from its position as industry leader. The NES outsold its competitors 10 to 1.

The Atari 2600, the first cartridge-based console, hit the market during the holiday season of 1977 for \$249.99. This year's holiday season will be shared by three hardware providers – Sony's PlayStation 2 for \$299.99, Microsoft's Xbox for \$299.99, and Nintendo's GameCube for \$199.99. All three hardware platforms are more powerful than any supercomputer that existed during the time of the Atari 2600. The industry has grown from individuals working out of their garages to multi-billion dollar corporations selling games around the globe. The current size of the video game market in the United States is over \$10 billion, rivaling the U.S. film industry.

In order to aid Governor Leavitt and the Utah Silicon Valley Alliance in accelerating Utah's emergence as a center for technology and entrepreneurship and aid Utah in capturing a larger piece of the video game pie, this document was written to achieve the following three objectives:

- Characterize the video game industry
- Make recommendations based on industry observations that will help Utah develop the video game industry within the state
- Create a list of key industry players that could play a strategic role in the development of the video game industry within the state.

We used three methods to conduct our research:

- We interviewed nine executive officers from companies located in Utah and currently a part of the video game industry. In addition we conducted interviews with individuals working in the industry outside of Utah and with market analysts and researchers specializing in the entertainment industry.
- We created an electronic survey using the services provided by www.surveympro.com that was completed by 16 companies that are players in the video game arena. This survey asked for information such

- as basic company financials and the perception of Utah's technology business environment.
- We relied extensively on secondary research. This research was almost exclusively conducted on the Internet. Information such as company descriptives, financials, and contact information was collected using this method.

We feel as though we were successful in achieving the objectives of this study as outlined above. In doing so we have concluded that the video game industry is very attractive due to its recession proof nature, the fact that it builds on Utah's existing competencies of software development, and that Utah already has several successful companies. Based on these facts, Utah would be wise to make the growth and development of the video game industry within the state one of its highest priorities.

FINDINGS

Observation #1: Computer and video games was a \$17.7 billion industry worldwide in 2000 and is expected to grow to \$26.7 billion by 2005. The industry's total value in the U.S. based on game publishing, transportation, wholesale and retail sales, and other related areas, is now \$10.5 billion, rivaling the film industry. About 60 percent of Americans, or about 165 million people, regularly play computer games. According to the Interactive Digital Software Association (IDSA), by 2005, 70 percent of U.S. households will have a game console, a penetration rate approaching that of the VCR. The size and predicted growth of the video and computer game industry coupled with Utah's current presence in this area make it an attractive high-tech industry to further grow within the state.

Observation #2: After five years of outstanding growth, the video game industry went through a transitional period in 2000. Sales slowed in the U.S. as a new hardware system was launched and consumers await additional new console launches later this year. Even though this lag in hardware is affecting the market, the recession is not. Rich Ow with the NPD group, a New York based marketing group, says the slowing economy will not hurt sales because the video game industry is recession proof. Doug Lowenstein, president of the IDSA, predicts that the industry will grow 50 to 75 percent over the next four or five years. This growth is fueled by the beginning of a new console cycle, improving from a 32-bit console to a 128-bit console, with Sony introducing the PlayStation 2 at the end of last year and Microsoft and Nintendo introducing next generation consoles later this year. The growing installed base of PC users also continues to provide a strong platform for games.

Observation #3: The stereotypical male teenager differs widely from the actual demographic makeup of game players. The average age of a game player is 28 and 43 percent of players are women. Age consolidation has also occurred within the industry, with games being developed for younger and younger children, a sector that is growing more than twice as fast as the total console market.

Observation #4: The majority of games published do not contain excessive violence or sex. Over 70 percent of games rated by the Entertainment Software Rating Board (ESRB) are rated “Everyone,” and 19 of the top 20 best selling games in 2000 were rated either “Everyone” or “Teen,” leaving only one rated “Mature.”

Observation #5: The National Institute on Media and the Family reported in their annual Video and Computer Game Report Card released in January that only 41 percent of youth in their study and only 29 percent of their parents understand all of the ratings issued by the ESRB.

Observation #6: Because hardware is usually sold at a loss and large, established players (Sony, Nintendo and Microsoft) dominate the, the hardware segment of the industry is not attractive to new entrants.

Observation #7: While the battle later this year for market share in consoles will be fierce (at least 75 percent of game console sales occur around the holidays), the consensus view is that there is room for all three hardware makers.

Observation #8: Although household PC penetration is now 51 percent in the U.S. and 31.5 percent in Europe, there has been a steady decline in the average number of PC games purchased by PC owners. Screen Digest believes the growth in demand for PC leisure software will continue to slow over the next five years.

Observation #9: Handheld consoles experienced significant success in 2000. Portable software sales rose 26 percent in dollars and 28 percent in units. The portable accessories category had an increase of 56 percent in dollars and 76 percent in units compared to 1999. Three of the top five best-selling video games in 2000 were Pokémon titles for Game Boy, Nintendo’s portable platform.

Observation #10: In 2000, over 219 million computer and video games were sold, or almost two games for every household in the U.S and three million more units than in 1999. The conventional wisdom is that each console generation produces 50 percent more revenue than the one before, creating an attractive opportunity for game developers and publishers.

Observation #11: Development of a cutting-edge game now takes a team of 20 or more 18 to 24 months and can cost as much as \$3 million to \$10 million to produce, with the cost of each title rising between 30 and 50 percent when moving to a next-generation platform. Because the publisher usually supports these rising costs of game development, the market is dominated by a few large publishers with smaller publishers existing only in niche markets.

Observation #12: The Video game value chain has six links. They are:

- Game Developers
- Artistic Services
- Programming
- Testing
- Publishing
- Retailing

All intellectual property contained within a game is generated in the first four links of the chain. Publishers assume all financial risk during the development process and pay developers advances on future game royalties. Because of the financial risk taken by publishers they stand to make the most money if a game is successful.

Observation #13: When compared to similar software development jobs, every position available for employment within the video game value chain pays above average salary. For example, game programmers with one year of experience make an average of \$59,127 while programmers in other fields with the same experience make an average of \$47,550.

Observation #14: Much of the research conducted by the computer science departments at local universities, especially the U of U and BYU, involves computer graphics. Graduates of these departments are able to begin working in the video game industry for companies requiring less work experience.

Observation #15: The U of U launched a Computational Engineering & Science degree this year, which should augment the local labor pool as it relates to game development and graphics jobs.

Observation #16: When a game is finished the publisher owns little more than the game title, with its characters, plot, music, etc. However, the game developer owns any tools, engines, artificial intelligence (AI) algorithms, etc. that it developed during the game's creation. Game developers can reuse these components in order to develop better future games in less time.

Observation #17: A love for video games is a key component for all who plan on working in the video game industry. Game testing, because of its entry-level status, is the only position available to those who do not have a college education. Despite this fact, game testers are often encouraged to seek higher education, such as a computer technicians certificate and/or a college degree, in order to help them in their current position and allow them the opportunity to climb the ranks in the future.

Observation #18: Most of the work during the development of a video game is done by one company. Usually a company is divided up in functional units such as game design, programming, art, music, etc. and work as a team until the game's completion. When needed, game developers will hire on a contractual basis from outside their own company to get additional or specialized help.

Observation #19: The Internet is changing the video game industry in the following ways:

- Providing a model for continuous revenues
- Forcing game developers to worry about cheating
- Providing a means through which developers can sell their games directly to consumers

Observation #20: Historically, publishers collected revenues only at the point of sale (POS) of a game title. Because the Internet allows gamers from all over the world to log in and play games with each other, massive multi-player games have emerged in which players interact in a real-time environment. This massive real-time interaction is accomplished by allowing players to log onto a central game server. Because players are charged a monthly fee for this privilege, game publishers can now collect revenues on game titles beyond the initial POS. One company who has seen great success from using this business model is Sony. Although Sony will not comment on the size of their profit margin, they have said that they are making a profit on the \$3.8 million it collects each month from game subscriptions. Datamonitor has predicted that the size of the online game market will reach \$4 billion by 2005.

Observation #21: Before the advent of online gaming, game players were competing against no one but themselves. Now that players are competing with others from all over the world, game developers and publishers must concern themselves with cheating. Matt Pritchard, who was involved in the development of Age of Empires, said, "Just how serious should you as a developer take the possibility of online cheating? ...If your game is a multiplayer only, the success of your entire product is at stake." Cheating has caused tournaments to be

cancelled, players to become disgruntled and developers/publishers to lose face. Even though the financial losses due to cheating are not easily quantifiable, there isn't a single company out there that develops multi-player games that will deny that cheating is a growing concern.

Observation #22: Video games are unique in that they require no physical goods to make a sale. All the information that is needed for a gamer to play a game can be downloaded directly over the Internet. While this may sound like a perfect way for developers to cut retailers and publishers from the value chain and in return collect more revenues on their game titles, there are three major obstacles that stand in the way of its implementation:

1. Currently there are no good methods for protecting against piracy and the illegal distribution of copied games
2. The very size of new cutting edge games and the limited availability and use of broadband make downloading games nearly impossible
3. At this time, consumers are not willing to change their buying habits

Despite these three obstacles, RealArcade (www.realracade.com) is pursuing a direct distribution model.

Observation #23: Owing to the fact that many people now carry either a cell phone or a PDA or have PC (all of which are connected to the Internet via a narrowband connection) there is a growing demand for simple, small games that are not time consuming to play. This growing demand is allowing small mom-and-pop shops to run successful businesses either through RealArcade or some other means of direct distribution.

Observation #24: New advances in hardware are also pushing to reshape the value chain. As hardware advances, so do the games. And as games advance development costs go up. It is the opinion of many industry insiders that game developers will be unaffected by this shift, but that small publishers will either be bought by bigger publishers or will go out of business. Small publishers simply do not have deep enough pockets to develop for next generation hardware.

Observation #25: This generation's hardware war (which will begin this November with the introduction of Microsoft's Xbox and Nintendo's GameCube) will be the first to include the Internet as a means for connecting players. Although this connectivity will play an important role in the outcome of the war, the real payoff to hardware companies will be years down the road when video game systems are used as an all in one entertainment system. Such a system would include DVD playback, CD playback, MP3 playback, video

recording, and Internet access. Datamonitor predicts that within the next three years, more people will be using their game systems to connect to the Internet than their PCs.

Observation #26: Like the rest of the consumer electronics industry, video game hardware is experiencing convergence. As the lines blur between business electronics (cell phones, computers, PDAs, etc.) and entertainment electronics (computers, cell phones, DVD players, video game systems, etc.) market shares within the video game market will shift. For example, Nintendo, who currently enjoys a 90 percent market share in portable gaming, will experience competition from cell phones and PDAs. Despite this possible disruption to hardware manufacturers, game developers and publishers will experience little, if any, change as a result of convergence.

Observation #27: Utah currently has about nine companies focused exclusively on video and computer game development. Many of these companies are developing games for next generation hardware and are well known for past game titles. Utah enjoys an established presence in the video game industry although that presence isn't very well known outside of the State.

Observation #28: When asked to rate Utah's overall technology business environment, 53 percent gave an "average" rating, 33 percent gave a "strong" rating, and 13 percent gave a "weak" rating. Only half of the respondents commented on Utah's strengths and weaknesses, with several stating they did not have sufficient knowledge of Utah to respond.

Observation #29: The dominant pattern for companies within this industry is not to IPO, but instead to be acquired by a large publisher. Because of the power dynamic between the publisher and developer, the large amounts of money required to develop a game, and the experience and reputation necessary to successfully market a game, acquisition is the easiest and safest growth strategy for developers.

RECOMMENDATIONS

Recommendation #1: Focus on building up the existing game development within the state rather than attracting publishers to the state, despite the fact that publishers stand to make the largest profits from successful game titles. Large publishers typically do not expand or relocate except through the acquisitions of other companies. Instead, creating a hot bed of game development within the state will capture the attention of publishers. Fostering strong relationships with existing Utah game developers and large publishers will act as a catalyst for industry growth in the state.

Recommendation #2: Convince Novell to begin publishing video game titles. Novell is the state's largest software developer and publisher and is famous for its business software applications. Currently, all software published by Novell was developed in house. While it might be possible for Novell to develop video game titles in house, it is our opinion that they would be more successful working with an outside game developer. We formed this opinion based on two simple facts:

1. Novell is experienced in publishing and launching new software.
2. There are many experienced game developers with established reputations located close to the Novell campus.

If Novell were both financially able and willing to fund a few initial video game titles with local developers they could see huge returns (depending on the success of the title) within two to three years. This would in turn aid the state in growing the Utah video game industry.

Recommendation #3: Market Utah's existing presence in game development along with Utah's general strength in software development and its association to video game history (the birth place of Atari's founder). Awareness of Utah's high-tech activities and, more specifically, its presence in the video and computer game industry, needs to grow among individuals and companies within the industry. Nine of the 12 non-Utah based survey respondents did not list Utah's strengths or weaknesses, with several citing insufficient knowledge of the state as the reason for not answering.

Recommendation #4: Focus on the diversity and the recreational activities that exist within the state in recruitment efforts. Several survey respondents, both within and out of the state, cited the perception of Utah as a state with a low tolerance level and a "lack of political, cultural, racial, and thought diversity." An executive at one local company stated that recruiters routinely tell him that Utah is a harder sell than other states. By actively branding the strengths of the state, these perceptions will change, making Utah a more attractive location and an easier place to recruit people to.

Recommendation #5: Strengthen all existing programs in computer science, computer graphics, and art. This task will require a two-pronged approach:

- Start programs that will encourage elementary, middle, and high school aged kids to get involved in the engineering fields.
- Make and strengthen ties between University programs and local businesses.

Video games and computers are an easy sell to most youth. When first exposed most youth are intrigued by them, but later are discouraged by the complexity of studying them and loose interest. Programs aimed at encouraging interested students must be put in place during primary schooling if Governor Leavitt's goal of doubling and later tripling the number of engineering graduates is going to be reached. Such programs would also help to grow video game development in the state by growing the qualified labor pool.

By strengthening ties between University programs and local business, Universities programs will become better suited to meet local labor needs. By tailoring these programs to local needs, graduates will already have ties to local companies and will be more likely to stay in the state. In addition, local companies will get the benefit of a more qualified labor pool from which to draw.

Recommendation #6: Foster the growth of small startup developers. By helping new companies survive, the state will benefit from an influx of new ideas. In addition, this will better position the state to benefit from the direct business model – more developers selling direct means more revenues for the state.

Recommendation #7: Build the availability and usage of broadband Internet connections. By doing so, the state will be positioned to take advantage of emerging business models such as the subscription model and the direct model. In the case of Novell becoming a game publisher, continual subscription revenues mean a monthly influx of large sums of money to the state. In addition, a well-developed broadband backbone will allow the state to take full advantage of developers making money through direct sales of video games.

Recommendation #8: Provide help, in addition to broadband Internet availability, that will allow developers to take advantage of the direct business model. Because the State has a strong presence of game developers, Utah stands to gain from the direct business model. In light of this, the state should initiate programs to help developers overcome piracy and established consumer habits so that these additional state revenues can be realized as soon as possible.

ESTABLISHED UTAH COMPANIES

Below is a list of companies that already exist in Utah. It is important to remember that these companies are already working hard to grow video game development within the state. In the making of any policy decision it is important that these companies be considered and consulted. Although we believe this list to be complete, the constant flux within the industry creates the possibility that a few developers have been overlooked.

Company	Pres/CEO	General Phone #
<i>Utah Companies:</i>		
<i>Acclaim Entertainment, Inc.</i> (Salt Lake City, UT) www.acclaim.com	Chip Luman (Gen. Manager)	(801) 486-2222
<i>Alpine Studios, Inc.</i> (American Fork, UT) www.alpine-studios.com	Ross Wolfley Les Pardew (Co-founders)	(801) 772-0313
<i>Avalanche Software</i> (Salt Lake City, UT) www.avalanchesoftware.com	James Henn	(801) 595-1140
<i>Beyond Games</i> (Salt Lake City, UT) www.beyondgames.com	Kris Johnson	(801) 531-8500
<i>Headgate Studios</i> (Bountiful, UT) www.headgatestudios.com	Vance L. Cook	(801) 298-3800
<i>Incognito Studios</i> (Salt Lake City, UT) www.incognitostudio.com	Scott Campbell	(801) 533-0756
<i>Kodiak Interactive Software</i> (Salt Lake City, UT) www.kodiakgames.com	Jonathan Slager	(801) 266-5400
<i>Microsoft Salt Lake</i> (Salt Lake City, UT) www.microsoft.com/games	Dave Curtin (Gen. Manager)	(801) 257-6300
<i>Saffire, Inc.</i> (American Fork, UT) www.saffire.com	Hal Rushton	(801) 847-1400

TARGET COMPANIES

Below is a list of companies that we feel are of interest to the state. The first section are the industry's biggest publishers and console makers. As mentioned before, although it is unlikely that any of these companies would relocate to Utah, the video game industry cannot currently function on any level without publishers. Therefore it is important to remember that fostering existing relationships between these publishers and existing Utah game developers is very important. The second section of this list contains the contact information of game developers that we feel could be persuaded to take interest in Utah. The last section of this report lists three companies that are currently developing games that are being distributed using the Internet. These companies are generally very small, but have huge potential and therefore should not be overlooked in recruiting efforts.

Company	CEO	General Phone #
<i>Publishers:</i>		
Activision, Inc. (Santa Monica, CA) www.activision.com	Robert Kotick	(310) 255-2000
Electronic Arts (San Mateo, CA) www.ea.com	Larry Probst	(650) 628-1500
Infogrames Entertainment S.A. (San Jose, CA) www.infogrames.com	Bruno Bonnell	(212) 726-6500
Nintendo (Redmond, WA) www.nintendo.com www.gameboy.com	Hiroshi Yamauchi	(425) 882-2040
Sony (Foster City, CA) www.world.sony.com	Ken Kutaragi	(650) 655-8000
Take-Two Interactive (New York, NY) www.take2games.com	Kelly Summer	(212) 334-6633
THQ, Inc. (Calabas, CA) www.thq.com	Brian Farrell	(818) 871-5000

<i>Developers:</i>		
Amaze Entertainment (Kirkland, WA) www.amazeent.com	Dan Elenbaas	(425) 825-6800
Artificial Mind & Movement (Montréal Québec) www.a2m.com	Rémi Racine	(514) 843-4484
Attention to Detail (Warwickshire, UK) www.atd.co.uk	Nicholas Paul Seddon	+44 (0) 1926 843444
BioWare, Corp. (Edmonton, Alberta) www.bioware.com	Ray Muzyka & Greg Zeschuk	(780) 430-0164
Climax (Fareham, UK) www.climax.co.uk	Karl Jefferey	+44 (0) 1329 827777
Codemasters (Warwickshire, UK) www.codemasters.com	David & Jim Darling	+44 (0) 1926 814132
Crave Entertainment (Dominguez, CA) www.cravegames.com	Nima Taghavi	(310) 687-5400
Kuju Entertainment (Surrey, UK) www.kuju.com	Jonathan Newth, Managing Director	+44 (0) 1483 414344
Mythic Entertainment (Fairfax, VA) www.mythicentertainment.com	Mark Jacobs	(703) 934-0449
Z-Axis (Hayward, CA) www.z-axis.com	David Luntz	(510) 887-7900
<i>Direct Model Developers:</i>		
PopCap Games (Auburn, WA) www.popcapgames.com	John Vechey (Dir. of Business Dev.)	(235) 288-0844
Small Rockets (Surrey, UK) www.smallrockets.com	Jonathan Small	(0) 1483 445440
Sierra, Inc. (Bellevue, WA) www.sierra.com	Thomas K. Hernquist	(425) 649-9800

GENERAL INDUSTRY

INDUSTRY SIZE AND GROWTH

Computer and video games was a \$17.7 billion industry worldwide in 2000 and is expected to grow to \$26.7 billion by 2005. Last year, video game sales in the U.S. totaled \$6.5 billion for console and portable hardware, software, and accessories. The industry's total value in the U.S. based on game publishing, transportation, wholesale and retail sales, and other related areas, is now \$10.5 billion, rivaling the market for movies.¹ The European portion of this industry was worth \$5.7 billion in 2000 and is forecasted to reach \$8.8 billion by 2005.²

The total value of the computer and video game industry in the U.S. is now \$10.5 billion, rivaling the market for movies.

Game sales have grown 15 percent a year from 1997 to 2000, according to a report released by the Interactive Digital Software Association (IDSA), the trade association representing the U.S. computer and video game industry. The industry created more than 219,000 jobs and paid \$7.2 billion in wages in the U.S. in 2000, according to the study. Doug Lowenstein, president of the software association, predicts that the industry will grow 50 to 75 percent over the next four or five years.³ This growth is fueled by the beginning of a new console cycle, improving from a 32-bit console to a 128-bit console, with Sony introducing the PlayStation 2 at the end of last year and Microsoft and Nintendo introducing next generation consoles later this year. The growing installed base of PC users also continues to provide a strong platform for games. The demographics of game players are evolving as interactive entertainment has become more mainstream. Also, the Internet has spawned the phenomenon of multiplayer online gaming, which will only increase with the emergence of broadband capabilities.⁴

By 2005, 70 percent of U.S. households will have a game console.

About 60 percent of Americans, or about 165 million people, regularly play computer games. Last year they spent more on gaming than on going to the movies.⁵ Americans now name video games as their favorite form of entertainment, according to one recent survey by the IDSA. TV came in a distant second, with Web-surfing third. If home entertainment systems like PlayStation are included, then video games are the runaway national pastime. According to the IDSA, by 2005, 70 percent of U.S. households will have a game console, a penetration rate approaching that of the VCR.⁶

After five years of outstanding growth, the video game industry went through a transitional period in 2000 in the U.S., according to a report by the NPD TRSTS Video Game Service, a New York-based marketing firm that tracks U.S. video game sales. Video game sales in the U.S. were down 5.8 percent in 2000 from an all-time high of \$6.9 billion in 1999. For the year 2000, video game consoles such as Sony's PlayStation One, Sega's Dreamcast, and Nintendo's N64 were the most affected devices with a 21 percent decrease, from 11.8 million units sold in 1999 to 8.2 million in 2000. Possibly as a result of this downturn, Sega announced earlier this year that it would no longer offer its console, but will instead focus solely on software. The overall amount of units sold (consoles, games, and accessories) went from 188.6 billion units in 1999 to 191.4 billion units in 2000, which amounts to a one percent increase.⁷ The percent changes from 1999 to 2000 are summarized by quarter in table 1.

Table 1: Percent Change in Sales					
Console, Game, and Accessory Sales		PC Game Sales		PC Game Sales (in units)	
Quarter	Change from 1999	Quarter	Change from 1999	Quarter	Change from 1999
Q1	5.0%	Q1	3.8%	T1	9.0%
Q2	3.3%	Q2	8.8%	T2	10.3%
Q3	-25.0%	Q3	10.7%	T3	18.2%
Q4	-4.0%	Q4	-8.4%	T4	1.0%

Source: NPD Group

The industry is feeling the effects of the shift from 64-bit to 128-bit consoles. "This is a cyclical business, with mountains and valleys. We are in a transition phase," says Mitsuko Morita, games analyst at Morgan Stanley Dean Witter. The most immediate factor affecting the industry is the technological progress that has made home consoles look more like slick Internet terminals than the plastic toys they were two decades ago. This has two implications for game makers: they need access to more capital for research and development and, as consoles include more complicated computer and telecommunications technology, they are more likely to have problems in production. But to the consumer, the differences between one generation and the next are shrinking. For example, when game makers upgraded from 8-bit to 16-bit consoles, a huge improvement

in graphics, sound, and content was realized. The 32-bit generation made images three-dimensional, but "the shift from 32-bit to 128-bit is not nearly as noticeable as was the case in the past," according to Shunji Yamashina, Societe Generale analyst.⁸

At the same time, the demographics of the industry are evolving. Some executives believe hard-core gamers, the enthusiasts who sustain the industry, are losing interest. Hideki Sato, Sega vice president, said, "People are sick of standalone games. They want to play against other people in a virtual environment." And although the proportion of women and older gamers has grown, developers have a poor understanding of the kind of games these new customers want to play.⁹ "Our business won't be prosperous if we don't focus on people who are middle-aged and beyond," said Toshiro Tateno, an executive corporate officer at Japanese game maker Konami.¹⁰

Although the lack of new game software and the cost of developing game machines may be hurting the industry's outlook, the recession is not. Rich Ow with the NPD group says the slowing economy will not hurt sales. "When it comes to entertainment, people spend regardless of the economy," he said. "The market was awful this last year, but video games [sales] were only down 5 percent."¹¹ As further proof of the viability of the industry, shares of the leading game publishers have been soaring at a time when most tech stocks have been pounded. Since the end of 2000, for instance, shares of Electronic Arts, the industry leader, have gained 34 percent. Its rivals have done even better: THQ is up 52 percent; Activision has gained 73 percent. Electronics Boutique, a West Chester, PA-based retailer focused on video gaming, is up 46 percent. And Nvidia, maker of the graphics chips in Microsoft's next generation console, the Xbox, has soared 144 percent. The sector offers advantages over other tech stocks, says Michael P. Wallace, an analyst with UBS Warburg. "They have a lot of earnings visibility," he notes. "Plus, the industry is largely recession-proof. In the 1990-91 recession, the video game sector didn't miss a beat."¹²

The computer and video game industry is poised for renewed and substantial growth.

The IDSA believes the computer and video game industry is poised for renewed and substantial growth following the slower transition year when sales slowed as a new hardware system was launched and consumers await additional new console launches in 2001. "As expected, 2000 was a soft year compared to the industry's double-digit growth rates through the mid and late nineties," said Lowenstein, President of the IDSA. "On the other hand, compared to the previous transition year of 1994-1995, the industry proved more resilient and entrenched. With more new technology advances on the horizon, growing online game revenue opportunities, and ever more advanced artistry

and creativity by developers, the video game industry will perhaps be the most important entertainment medium in this new century.”¹³

Companies fully expect the new consoles not only to penetrate the market but broaden it substantially over the next 12 to 18 months, as has happened in every previous generation of video game systems over the last 20 years.¹⁴ Based on its survey of top CEOs representing companies generating more than 75 percent of annual industry sales, the IDSA forecast that sales in 2001 are expected to surge at least 11 percent, with potential gains of 15 to 20 percent. Moreover, based on historical patterns, IDSA expects sales to grow 20 percent or more between 2002 and 2004, lifting total U.S. video game software sales to more than \$10 billion. Looking farther ahead, 73 percent of the CEOs agree that computer and video games will be the most important entertainment art form of the 21st century. This confidence is linked to several related factors:

- The increasingly broad demographic appeal of interactive games;
- The maturing of a tech-savvy generation raised on computer and video games and the general attraction for entertainment that users can direct, control, and interact with;
- The potential for next generation consoles to be the hub for home entertainment;
- The full emergence of technology which makes the game experience even more realistic, adding stunning graphics and sound effects and allowing game developers to continually improve the entertainment experience;
- The expanding online game market, including subscriptions, pay-per-play and advertising revenues.¹⁵

THE HISTORY OF VIDEO GAMES¹⁶

MIT student Steve Russell created Spacewar, the first interactive computer game, in 1961 on a mainframe computer. Limited by the computer technology of the time, ASCII text characters were the "graphics," and people could only play the game on a device that took up the floor space of a small house. In 1970, with the help of Ted Dabney, Nolan Bushnell, a University of Utah engineering graduate, turned his daughter's bedroom into a workshop to build an arcade version of Spacewar called Computer Space.

Bushnell and Dabney formed Atari in 1972 to design video games, the first being Pong in arcade format. The company released its first cartridge-based game system, the Video Computer System (VCS - later known as the Atari 2600) in time for Christmas 1977 for \$249.95. In 1980, several VCS programmers left Atari in a dispute over game credits and formed Activision, the first "third-party developer."

The year 1980 also saw the opening of Nintendo of America in New York City (the company later moved to Seattle) and the release of Pac-Man, the most popular arcade game of all time. Over 300,000 units were sold worldwide, with more than 100,000 units sold in the U. S. alone. In 1981, Nintendo artist Shigeru Miyamoto created Donkey Kong. The hero, originally called Jumpman, was later named Mario by Nintendo of America's staff, in honor of his resemblance to their landlord Mario Segali.

The video game industry went through a downturn from 1982 to 1984, with consoles not selling as well as expected in the oversaturated market. But in 1986, after a test release in New York, Nintendo marketed the Nintendo Entertainment System (NES) nationwide. Super Mario Brothers debuted with the system and became an instant hit. Following this successful release, Sega introduced its Sega Master System (SMS) in the U.S. Nintendo outsold its competitors 10 to 1 in the United States.

The 16-bit era for home consoles began in 1989, also the year Nintendo released its handheld Game Boy for \$109. By 1996, 64-bit consoles were in the market, and in 1999, Sega released its 128-bit Dreamcast system. Sony's PlayStation 2, Nintendo's GameCube, and Microsoft's Xbox also utilize 128-bit technology.

DEMOGRAPHICS

The stereotypical male teenager differs widely from the actual demographic makeup of game players. The average age of a game player is 28 and 43 percent of players are women.¹⁷ A detailed breakdown of players by age and general format is given in table 2. Ninety percent of all games are purchased by adults over the age of 18, with about half men and half women.

Table 2: Age of most frequent game players

Age in years	Computer	Console
< 18	28%	42%
18 - 35	30%	37%
> 35	42%	21%

Source: Interactive Digital Software Assoc.

While the overall video and computer game market was relatively flat last year, the kids' multimedia sector is experiencing an increase in sales, with growth in the number of younger children now playing video games. "The children's

sector is growing more than twice as fast as the total console market," says Hank Kaplan, president of New York's NewKidCo, a publisher of kids' video game titles. "The biggest issue in the toy business is 'age compression,' with kids not playing as long with traditional toys. More than one-third or 35 million U.S. homes have one kid under age 6 today, and this demographic is growing rapidly, which is great for all publishers who are developing more titles for this market." In 2000, kids' multimedia revenue increased 3.7 percent from \$301.4 million to \$312.5 million, on total unit sales of nearly 12 million, according to a NPD Interactive Entertainment Services report on children's entertainment at both brick-and-mortar and online retailers. Unit sales for the year were up 11 percent from the 10.8 million units sold in 1999.

Video game consoles were particularly popular with kids, with sales of Game Boy Color, Sony PlayStation, Nintendo 64, and Dreamcast leading the pack. Console revenue rose 83 percent to \$155.2 million from \$83 million in 1999, according to NPD. The number of units sold to the children's market increased 93 percent to 4.7 million, from 2.4 million in the prior year. "There were 50 new console titles for kids released in 2000, a 163 percent increase from only 19 the year before," says NPD analyst Kristin Barnett-Von Korff, who notes the top-selling title was THQ's Rugrats in Paris for Game Boy Color. "A 10-year-old actually has more disposable income for games than a 20-year-old, who has a lot more dollar concerns," explains David Cole, an analyst with DFC Intelligence.¹⁸

Cole says the age range for video games has been scaling downward for more than a decade, shifting from young adults to teens and now even to the toddler set, an audience that he says is expanding dramatically. "Kids age 5 or 6 now want games, so the [video game] entertainment market has shown real diversity in targeting younger age groups," says Cole. Kaplan says the shift to a younger audience for video games also means the online sales market is likely to become an increasingly more important factor in game sales. "The purchase decision-maker is often the parent, who finds the online shopping environment non-threatening and a good place to get good information on our titles," he says.¹⁹

Many of the games published now and in the past are classic "boy" games. But "boys and girls are equally challenged by technology," says Bill Bebee, senior vp of sales and marketing at Bandai Co., Ltd., the third largest toy company in the world, adding that "technology is often more readily applied to boys' products." "If we have the right property, we will absolutely apply technology to girls' products. You can create a good toy with technology and appeal to both boys and girls, if the technology is applied properly," he says. "We're always looking for the right license that we think we can apply to girls with our technology -- but at this point, we don't have anything," Bebee adds.²⁰ Although more women

are now playing games, great potential exists for the company that can publish the right game targeted to females.

According to the IDSA, 78 percent of game players do so because the games are challenging. Fifty-five percent play to relieve stress, 49 because “it’s a lot of entertainment value for the money,” and 39 percent because games are engrossing. A reported 37 percent play for the interactive social experience (almost 60 percent of frequent game players play with friends, 33 percent play with siblings, and about 25 percent play with their spouse and/or parents).²¹

GOVERNMENTAL REGULATIONS/RATINGS

The recent advances in technology have made possible a more realistic, graphic depiction of the themes of video and computer games. Violent, bloody, and sexually explicit game scenarios are more life-like than ever before. This has spurred an ongoing debate as to the effects of violence and inappropriate material on children playing these games.

Some believe “prolonged and excessive use of video and computer games contribute to obsessive, addictive behavior, dehumanization of the player, desensitizing of feelings, health problems and development of anti-social behavior as well as other disorders.”²² A \$5 billion lawsuit was filed in April by the families of several of the victims in the Columbine massacre in April 1999 against 25 entertainment companies, including several video game publishers and developers. The suit claims the tragedy would not have occurred in the absence of extremely violent video games and the shooters’ addiction to those games.²³

Recent advances in technology have made possible a more realistic, graphic depiction of the themes of games, spurring an ongoing debate as to the effects of violence on players.

Others, including many in the industry, are more skeptical of the claim of a causal relationship between video games and real-life behavior, citing the fact that overall violent crime has decreased while video game playing has increased over the past several years.²⁴

Regardless of one’s position in this debate, most agree all video and computer games are not appropriate for all ages. This has spurred a new debate as to where the responsibility lies for ensuring that games with explicit violence and/or sex are not readily available to children. In an effort to objectively rate the content of video and computer games, the Entertainment Software Rating Board (ESRB), the nation's leading non-profit, entertainment software rating body, was established in 1994. The ESRB is an independent, self-regulatory entity that provides services not only for rating all software titles, but also for

rating Websites and online games, for ensuring online privacy protection, and for reviewing advertising created by the interactive entertainment industry (See table 3 for a list of the rating symbols). The ESRB has rated over 7,000 games since its inception and more than 352 publishers have submitted products to the ESRB for ratings.²⁵

Table 3
ESRB RATING SYMBOLS FOR VIDEO GAMES & PC SOFTWARE

RATING SYMBOLS		<p>EARLY CHILDHOOD</p> <p>Content may be suitable for persons ages 3 and older. Contains no material that parents would find inappropriate.</p>		<p>EVERYONE</p> <p>Content may be suitable for persons ages 6 and older. May contain minimal violence and some comic mischief or crude language.</p>
		<p>TEEN</p> <p>Content may be suitable for persons ages 13 and older. May contain violent content, mild or strong language, and/or suggestive themes.</p>		<p>MATURE</p> <p>Content may be suitable for persons ages 17 and older. May contain mature sexual themes or more intense violence or language.</p>
		<p>ADULTS ONLY</p> <p>Content suitable only for adults. May include graphic depictions of sex and/or violence. Not intended for persons under the age of 18.</p>		<p>RATING PENDING</p> <p>Product has been submitted to the ESRB and is awaiting final rating.</p>
		<p>Descriptors are found on the lower left or right hand corner on the back of the box</p>		<p>Look for the rating symbol/icon symbols in the lower right and the lower left hand corner on the front of the box.</p>

In addition to the rating, consumers should check for important content information (also called "descriptors" found in table 4) in the black-and-white box on the back of the package. These content descriptors give more details about the product in terms of violence, sexual themes, language, and other areas that may be of interest to some consumers. If there is no content descriptor on the back of the package, the Rating Board believes that the product does not include content that must be highlighted.

Table 4
ESRB CONTENT DESCRIPTORS FOR VIDEO GAMES & PC SOFTWARE

Animated Blood	Animated/pixilated or cartoon-like depictions of blood.
Blood	Contains depictions of blood.
Blood and Gore	Contains depictions of mutilation or dismemberment of body parts.
Comic Mischief	Contains scenes depicting activities characterized as slapstick or gross vulgar humor.
Edutainment	Content of product provides user wit specific skills development or reinforcement learning within an entertainment setting. Skill development is an integral part of product.
Gambling	The depictions of betting like behavior.
Gaming	The depiction of betting-like behavior.
Informational	Overall content of product contains data, facts, resource information, reference materials or instructional text.
Mature Sexual Themes	Contains provocative material, including depiction of the human body in either animated or photographic like formats.

Mild Language	Product contains the use of words like "damn."
Mild Lyrics	Mild references to profanity, sexuality, violence, alcohol, or drug use.
Mild Violence	Scenes or activities, which depict characters in unsafe and/or violent situations.
Some Adult Assistance May Be Needed	Early Childhood Descriptor only
Strong Language	Commonly referenced four-letter words.
Strong Lyrics	Profanity and explicit references to sex, violence, alcohol, or drug use.
Strong Sexual Content	Graphic depiction of sexual behavior and/or the human form (i.e., frontal nudity) in either animated or photographic like detail.
Suggestive Themes	Mild provocative references or materials.
Use of Drugs	Product contains images of the use of drugs in a manner, which condones or glorifies their use.
Use of Tobacco and Alcohol	Product contains images of the use of tobacco and/or alcohol in a manner, which condones or glorifies their use.
Violence	Scenes or activities, which involve violent acts.

The majority of games published do not contain excessive violence or sex. Over 70 percent of games rated by the ESRB are rated “Everyone,” and 19 of the top 20 best selling games in 2000 were rated either “Everyone” or “Teen,” leaving only one rated “Mature.” (In 1999, none of the top 20 best selling games were rated “Mature.”) The IDSA reports that 84 percent of video game purchasers under the age of 18 get their parents’ permission before buying a game.²⁶

The majority of games published do not contain excessive violence or sex.

With the rating system firmly established, the need to educate consumers about ESRB ratings has now become paramount. The National Institute on Media and the Family, an independent, non-partisan, non-sectarian, non-profit organization, reported in their annual Video and Computer Game Report Card released in January that only 41 percent of youth in their study and only 29 percent of their parents understand all of the ratings. Only 32 percent of stores provide any education in the form of posters or pamphlets, up from 26 percent in 1999, and only 37 percent of stores have a policy of training employees about the ratings.²⁷

Only 41 percent of youth and only 29 percent of their parents understand all of the ratings.

LEGISLATION

Earlier this year British Columbia announced legislation for a classification system for video games that uses the ESRB rating system. Under this system, games rated “Teen” are defined as suitable for those over 14, and games rated “Mature” or “Adult Only” will only be available to those 18 and over.²⁸ The highlights of the proposed legislation are:

- Storeowners will be required to display “Mature” video games on a separate shelf so parents can easily identify them. “Adult Only” games will have to be kept in a separate room from other games in the same manner as “Adult Only” video films.
- The director of film classification will review “Adult Only” and “Mature” video games for obscene or excessively violent content and will be able to ban them from sale or rental in B.C. under the same criteria applied to films.
- Conditions will be imposed for selling or renting video games so minors cannot sample, rent or buy those classified as “Mature” or “Adult Only”.
- An advisory board will be established to help government monitor the ratings system’s effectiveness and provide advice to the attorney general.

The growth of the video game industry has also caught the attention of lawmakers in the U.S. Sens. Joseph Lieberman, D-Conn., and Herb Kohl, D-Wis

introduced the Media Marketing Accountability Act in April of this year. If passed, the Act would give the Federal Trade Commission (FTC) the power to pursue and fine entertainment companies that "target" market violent products to children. Manufacturers and sellers of violent video games would face stiff penalties, up to \$11,000 per day, per offense, for marketing their products to children.²⁹ This could have a significant impact on the industry. According to the FTC, who released an extensive study in September 2000, "Nearly all the game companies contacted have marketed violent "M"-rated games to children." The study also found that children could routinely buy or rent adult rated games with no difficulty.³⁰ Similar legislation was introduced in Tennessee in April 2000. Last year Indianapolis passed an ordinance prohibiting people under 18 from playing coin-operated video games noted for their violent content unless a parent or guardian accompanies the minor.

The debate is alive in Utah as well. The Provo City Council announced in April of this year that it is considering creating an ordinance that would restrict a minor's ability to buy violent video games. The council voted to study the issue for several months.³¹ Although some commend the city for addressing the issue, should the ordinance pass, minors are likely to migrate to Orem or other nearby communities with less restrictive ordinances to buy the games.

Several companies within the video game industry are also addressing this issue. Some major retail outlets including Sears have stopped selling "Mature"-rated games. Wal-Mart, Kmart and Toys R Us announced last fall that they would no longer sell adult-rated games to anyone under 17. Microsoft's Xbox will contain software that allows parents to prevent their children from playing games that are rated "Mature."³²

The attention given to violence in video games recently may not be having the effect on the industry desired by some. One executive at a game development firm stated that Sen. Lieberman's annual list of the most violent games has become a joke in the industry. Whoever tops the list always sees a positive hit in sales. "All the talk about violence in video games never really had an impact on the market. To some extent it was a sideshow," said Doug Lowenstein, president of the IDSA.³³

HARDWARE

The traditional formats on which video and computer games can be played are consoles, the PC, handheld devices, and arcades. Games can be developed for a single format or multiple formats.

CONSOLE PLATFORMS

Three players dominate the console hardware market: Sony, Nintendo, and Microsoft. Sega was a major player in this segment until earlier this year when the company announced its intentions to exit the hardware business and focus exclusively on software, developing games for what were once competitors.

Last year, Sony's PlayStation 2 game console debuted at \$299, and despite production problems, quickly sold out of stores worldwide. Sony is forecasting the sale of 30 million units by next April. Microsoft's Xbox will be on store shelves November 9th, also at the price of \$299. Nintendo's next generation GameCube console will debut November 5th at \$199, undercutting by \$100 Sony and Microsoft. Many believe the lower price on the GameCube will give Nintendo a big boost and help them reach beyond their traditional market with younger gamers and into a more mature demographic, currently dominated by Sony.³⁴

Sony's PlayStation brand currently dominates the market, with around 66 percent of consoles installed in homes worldwide. A study commissioned by the European Leisure Software Publishers Association predicts that by the end of 2004 PlayStation 2 will account for 37 percent of next generation consoles in U.S. homes (18.1 million units), 47 percent of those in European homes (15.65 million units), and 45 percent (12.3 million units) of those in Japanese homes. Microsoft's Xbox will have 33 percent European penetration (10.85 million units), 31 percent in the U.S. (15 million units) and about 20 percent (5.3 million units) in Japan.³⁵

Sony's PlayStation brand currently dominates the console market, with around 66 percent of consoles installed in homes worldwide.

While the battle later this year for market share in consoles will be fierce (at least 75 percent of game console sales occur around the holidays³⁶), the consensus view is that room exists for all three hardware makers, especially with Sega's recent departure.³⁷ Each company has an advantage in a different area. Sony has first mover advantage with over 50 percent global market share. The installed base of PlayStation 2 consoles should reach 30 million early next year, attracting third-party software developers and creating a powerful network effect. Microsoft's Xbox is technically superior, as the only new console with a hard drive and high-speed Internet access built in.³⁸

But Nintendo, with its in-house software team, owns key software franchises like Pokémon, Mario Bros. and the Legend of Zelda, none of which will appear on the other systems. These have helped Nintendo capture and retain a large segment of the market: the youngest game players.³⁹ The general consensus

"This is the period of time where the video games companies are laying the foundation for the success or failure of a console. Getting the right developers, getting the right games--that's the critical factor."

-Schelley Olhava, IDC

from those who attended the Electronic Entertainment Expo (E3), the industry's largest trade show, is that Nintendo's titles have "the smartest characters and most entertaining plots,"⁴⁰ which could make GameCube the leader. "This is the period of time where the video games companies are laying the foundation for the success or failure of a console. Getting the right developers, getting the right games--that's the critical factor," said Schelley Olhava, an analyst at market researcher IDC.⁴¹ By the end of the year Sony, with 300 developers working for the U.S. market alone, should have 200 titles available, compared with just 15 to 20 for the Xbox. Microsoft has attracted about 200 developers, but as a new entrant, the company does not have franchises such as Nintendo's Mario or Sony's Twisted Metal series that would guarantee gamers.⁴²

Once a winner emerges, game makers are much more likely to want to develop for the number one platform, providing even more incentive for each of console maker to dominate the industry. Because of this, the battle for console market share is also likely to be expensive. Microsoft has pledged to spend \$500 million advertising and marketing the Xbox in the 18 months following its launch, the largest product push in the company's history. Another half-billion is expected for a PlayStation 2 ad blitz. Nintendo committed \$75 million just for its Game Boy Advance launch this year.⁴³

Sony, Nintendo and Microsoft sell video game hardware at a loss, hoping to make money from software sales and royalties. The company that sells the most next generation consoles will suffer the worst short-term pressure on earnings but should capture a big long-term share of industry profits.⁴⁴ Sega President Peter Moore said, "The real truth about the video game industry is that it is becoming harder and harder to turn a profit with a hardware platform. The average loss on a piece of video game hardware is between \$50 and \$200. By the time the system hits shelves, most hardware companies are in the hole due to warehousing, shipping, and marketing costs. With increased development costs, someone is going to have to pay, but it certainly won't be the consumer."⁴⁵ In a report earlier this year, Merrill Lynch analyst Henry Blodget estimated that Microsoft would lose \$2 billion on the Xbox before it turns profitable in 2005.⁴⁶

Following are company profiles for Nintendo and Sony, the two major players with consoles currently on the market.



Nintendo of America

4820 150 Ave. NE
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 Tel: (425) 882-2040
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www.nintendo.com

Exec. VP, NOA: Peter Main

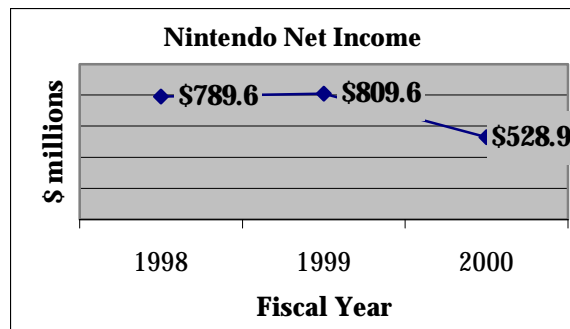
- Nintendo has sold more than one billion video games worldwide
- In 2000, Nintendo captured seven of the ten top-selling video games and widened its overall industry market share to 48 percent

As the worldwide leader and innovator in the creation of interactive entertainment, Nintendo Co. Ltd., of Kyoto, Japan, manufactures and markets hardware and software for its popular home video game systems including Game Boy, Nintendo 64, Game Boy Advance and the upcoming GameCube. Since the release of its first home video game system in 1985, Nintendo has sold more than 1.4 billion video games worldwide, creating enduring industry icons such as Mario and Donkey Kong and launching such franchises as Zelda and Pokémon. The company is publicly traded on the Tokyo and Osaka stock exchanges.

Nintendo of America Inc. was announced as a wholly owned subsidiary in 1980. Originally based in New York, Nintendo of America headquarters moved to Washington in 1982. The subsidiary serves as headquarters for Nintendo's operations in the Western Hemisphere.

Performance Measures	
Sales (FYE 2000)	\$5.00B
Sales Growth (FYE 2000)	-7.35%
Profit Margin (FYE 2000)	10.6%
Net Income (FYE 2000)	\$528.9M
Return-on-Assets (FYE 2000)	6.01%
Total Liabilities (FYE 2000)	\$1.63B
Debt-to-Equity (FYE 2000)	.23
Return-on-Equity (FYE 2000)	7.4%
Price-to-Earnings (FYE 2000)	N/A
Market Capitalization	N/A
# of Employees	N/A

Source: Nintendo 2000 Annual Report



SONY



*Sony Computer
Entertainment America*

919 E. Hillsdale Blvd. #200
Foster City, CA 94404
Tel: (650) 655-8000
www.sony.com
www.scea.com
www.playstation.com

CEO: Ken Kutaragi

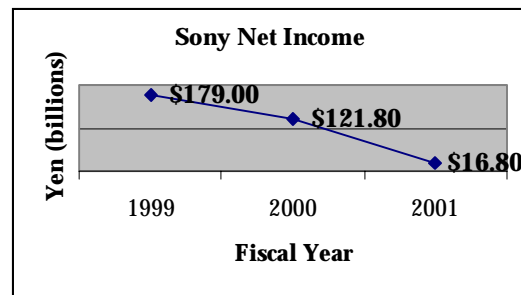
- PlayStation brand currently dominates the market with around 66 percent of consoles installed in homes worldwide
- Sony is forecasting the sale of 30 million PlayStation 2 units by next April

Sony Computer Entertainment America Inc., a wholly owned subsidiary of Sony Computer Entertainment Inc., is headquartered in Foster City, CA, and markets and distributes the PlayStation game console in North America. Sony's 989 Studios develop and produce software for the PlayStation games console, PC, and online markets. Games titles include NFL GameDay series, Twisted Metal Series, Cool Boarders series, Jet Moto series, and Everquest.

Sony Corporation (SNE) is the ultimate parent company of the Sony group. Sony is engaged in various businesses including electronics, games, music, pictures, insurance, banking, leasing, credit financing, satellite broadcasting, and location-based entertainment. In the Game business, Sony develops, produces, manufactures, markets and distributes home-use entertainment hardware and related software.

Performance Measures	
Sales (ttm)	\$58.8B
Sales Growth (FYE 2000)	9.39%
Profit Margin (ttm)	2.1%
Net Income (FYE 2001)	\$134M
Return-on-Assets (ttm)	2.07%
Total Liabilities	N/A
Debt-to-Equity (mrq)	.52
Return-on-Equity (ttm)	5.53%
Price-to-Earnings	56.49
Market Capitalization	\$51.1B
Stock Price (24 July 2001)	\$56.44
# of Employees	181,800

Source: Yahoo! Finance (SNE)



PERSONAL COMPUTER

With the proliferation of console gaming, the use of a PC as a gaming device has been declining. Although household PC penetration is now 51.0 percent in the U.S.⁴⁷ and 31.5 percent in Europe, there has been a steady decline in the average number of PC games purchased by PC owners. The game industry has found it difficult to broaden the market for PC games beyond an enthusiastic, but narrow demographic segment. Screen Digest believes the growth in demand for PC leisure software will continue to slow over the next five years. Further, the relentless pressure on the price of PC software is likely to mean overall falls in the value of the PC software market despite continuing growth in volume sales.⁴⁸

The use of a PC as a gaming device has been declining.

HANDHELD DEVICE

Handheld consoles experienced significant success in 2000. Portable software sales rose 26 percent in dollars and 28 percent in units. The portable accessories category had an increase of 56 percent in dollars and 76 percent in units compared to 1999.⁴⁹ Three of the top five best-selling video games in 2000 were Pokémon titles for Game Boy, Nintendo's portable platform.

Game Boy has enjoyed a virtual monopoly in the handheld gaming market. It is the biggest-selling home video game system of all time.

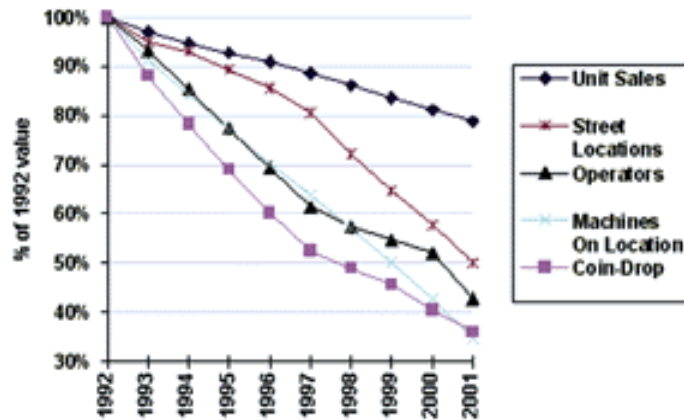
Game Boy has enjoyed a virtual monopoly in the handheld gaming market. It is the biggest-selling home video game system of all time, having sold 115 million units since it debuted more than 10 years ago. Game Boy represents 25 percent of the home-video game market in terms of units sold.⁵⁰ Nintendo launched its Game Boy Advance, a 32-bit handheld device, on June 11, 2001. The portable console system earned approximately \$45 million in revenue in its first week at retail, while Game Boy Advance software earned approximately \$18.5 million in revenue.⁵¹

Nintendo's competitors in console market may also enter the handheld market soon. Rumors exist that Microsoft is developing "Xboy", a potential competitor to the Game Boy, and in recent months Sony, while saying that it has no plans to develop a portable gaming device of its own, has been partnering with mobile phone companies in countries including the UK and Japan to explore ways of possible interaction between phones and its PlayStation console.⁵²

ARCADE

The coin-operated arcade video game market has seen ongoing declining demand over the last several years. Last year's sales of arcade games were less than one fifth of those in 1993.⁵³ Since 1992, the U.S. market for coin-op games sales have been down about 140,000 to 130,000 units a year; 33 percent fewer operators are running machines (from 7,500 to about 5,000); the number of locations where machines are installed has decreased by 15 percent; and the amount of money spent in the machines is down 40 percent. During the same period, the average price of a dedicated video machine has apparently risen by 77 percent.⁵⁴ (See table 5.) The U.S. has about 25 to 30 percent of the world coin-op market, with Japan and Europe (primarily the United Kingdom and Germany) bringing in about 25 percent each.

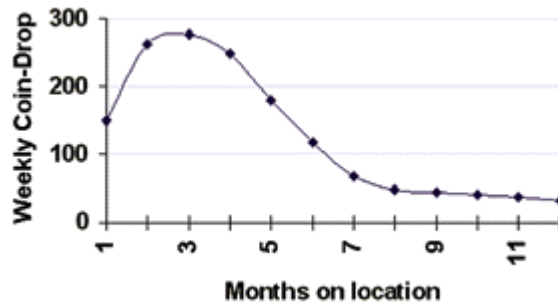
Table 5 - The economics of the coin-op trade



Source: Gamasutra

Each dedicated game unit may cost around \$15,000. Special units, such as the simulators with seating and cabins, cost around \$17,500. Developers of arcade systems do offer vendors kits, usually a plug-in or replacement circuit board and new software, to enable certain cabinets to be reused. These kits can cost around \$1,500, or about 10 percent of the cost of a new unit. Once a game has dropped off in revenues, the cabinet, if not reusable, is dead.⁵⁵ Table 6 shows the income trend for an arcade unit.

Table 6 - Traditional income of coin-op installation charted over time



Source: Gamasutra

Former Amusement and Music Operators Association president Frank Seninsky of Alpha-Omega Amusements in New Jersey stated that prohibitive pricing structures set by game manufacturers has contributed to the industry's downturn, saying, "The way I see it, over the past few years, is that the games have gotten so expensive that most operators are forced to put them out at ridiculously high prices per play, at \$1 or even higher, and the truth is that it's not working. People that play them initially are not coming back to spend that kind of money."⁵⁶ Some arcade operators are attempting to deal with this by charging groups a flat price for a fixed amount of time.

Home consoles are also a factor in the decline of arcades. When home video games were first marketed in the late 1970s and early 1980s the arcade industry had superior technology, which is no longer true as home computers and game consoles feature more powerful processors and graphics engines. Also, players can purchase games once to play countless times rather than pay each time they play an arcade game. Furthermore, online gaming has reduced the need to go to an arcade for social reasons, eliminating one more reason for playing at an arcade.⁵⁷

The arcade industry has been wary of the consumer games sector in recent years. Although arcades are simply another platform for game developers, most do not develop for them, thus providing video arcades with fewer attractive games. Midway, Capcom and SNK, former leaders in the arcade industry, have all recently announced either a slowdown in or withdrawal from coin-op development, signaling that the decline in arcades is not likely to reverse.⁵⁸

SOFTWARE

Video and computer games can be segmented by genre, including sports, arcade, action, strategy/role-playing, simulation, and educational. The biggest category of games in 2000 was strategy and role-playing games, with 21 percent of the market, followed by action (17 percent), sports (15 percent) and racing (10 percent).⁵⁹ Hunt-and-kill games are decreasing in market share.⁶⁰

In 2000, over 219 million computer and video games were sold, or almost two games for every household in the U.S and three million more units than in 1999, although sales in dollars remained virtually constant. Video game rentals also set a new high at \$918 million in 2000, \$38 million more than in 1999.⁶¹

In 2000, over 219 million computer and video games were sold, or almost two games for every household in the U.S.

Robert Kottick, CEO of Activision, the number two publisher and developer in the industry, says there's "never been a better time" to be selling video game software.⁶² The fierce competition among console makers, and the corresponding large marketing budgets, should expand game makers potential customer base. The conventional wisdom is that each console generation produces 50 percent more revenue than the one before, creating an attractive opportunity for game developers and publishers.

Software developers are not dependent on the success of any one platform and almost all major software publishers are hedging their bets by creating games for multiple formats with the hope of establishing a foothold in whatever console becomes the market leader.⁶³ Electronic Arts and THQ, numbers one and three in U.S. publishing, have both stated they are platform-agnostic, saying that they will make games for whatever platform is popular with consumers.⁶⁴ Although both should prosper whatever the outcome, the winner of the console war will have some bearing on their success. Electronic Arts has taken the early lead in games for Sony's PlayStation 2 while THQ has the best track record with games for Nintendo's old generation N64 and Game Boy.⁶⁵

But the software game industry isn't problem-free. Not only do video game companies face the danger of too many developers making too many similar games, but also development costs now rival the budgets for minor motion pictures. "Gone are the days when three guys in their garage could make a compelling game. Today you have to have great graphics designers, you have to have great sound people, and all those things cost money," Doug Lowenstein, president of the IDSA, said.⁶⁶ Development of a game now takes a team of 20 or more 18 to 24 months and can cost as much as \$3 million to \$10 million to produce,⁶⁷ with the cost of each title rising between 30 and 50 percent when

moving to a next generation platform. Peter Main, Nintendo of America's executive vice president said nearly three-fourths of the 1,300 games produced last year sold less than 300,000 copies, well under the estimated 350,000 to 400,000 needed to break even on the latest machines.⁶⁸

PUBLISHERS AND DEVELOPERS

For large independent publishing firms led by Electronic Arts, Activision, and THQ who dominate video game publishing in both sales and market share, these challenges faced by the industry do not prevent growth and continued success. These players produce blockbuster titles and have deep connections with console makers. Each year they offer a catalog of games, often bundling hits with lesser titles, enabling them to move almost all of their offerings.⁶⁹ They also have deep relationships with retailers, securing ideal shelf-space and creating a barrier to entry.

But small publishers, who usually focus either in niche markets or on hit franchises, exist in a different sphere. Without sufficient revenue or access to capital, this escalating cost structure may prove their biggest challenge. Trip Hawkins, founder of both Electronic Arts and spinoff 3DO, a small publisher based in California, said that any publisher without at least \$100 million in revenue has already been weeded out.⁷⁰ Such limited resources means the little publishers not only put out far fewer titles than the big players, but also might have to focus on a single hardware platform. Hawkins stated that, "The only way you're gonna stay small successfully is if you have your own brands." He said that the film industry in which a few huge studios dominate but many independents thrive by producing content for a small but loyal audience sets the precedent for the video game publishing industry.

A few large independent firms dominate video game publishing in both sales and market share, leaving only niche markets for small publishers.

Traditionally publishers pay developers advance royalties to develop a game. The publisher then owns the majority of the intellectual property and assumes all risks associated with the marketing of the game. Depending on the reputation of the developer and its relationship with the publisher, the specifics of the game are determined largely by the publisher. The developer receives a specified royalty for each unit sold once the publisher recovers the advances paid during development (the threshold). Some in the industry have speculated that in the past publishers have controlled the number of units sold so as not to go above the threshold. By doing this, developers would continue to be dependent upon the publisher for capital.

Hundreds of development studios exist throughout the world, largely concentrated in the U.S., Japan, and the UK. Because developers are so numerous, a company must have a reputation of producing successful games in a timely and cost-effective manner in order to win contracts with leading publishers.

A first-party developer of a game develops that game under the direction of a hardware maker for only one format. In return, the developer usually receives the same amount of or more money (spread over less work because of the single format) and may have a better royalty rate or an artificial threshold (receive royalties before the advances were completely paid off.) A third-party developer/publisher can develop the game for multiple formats.

VALUE CHAIN

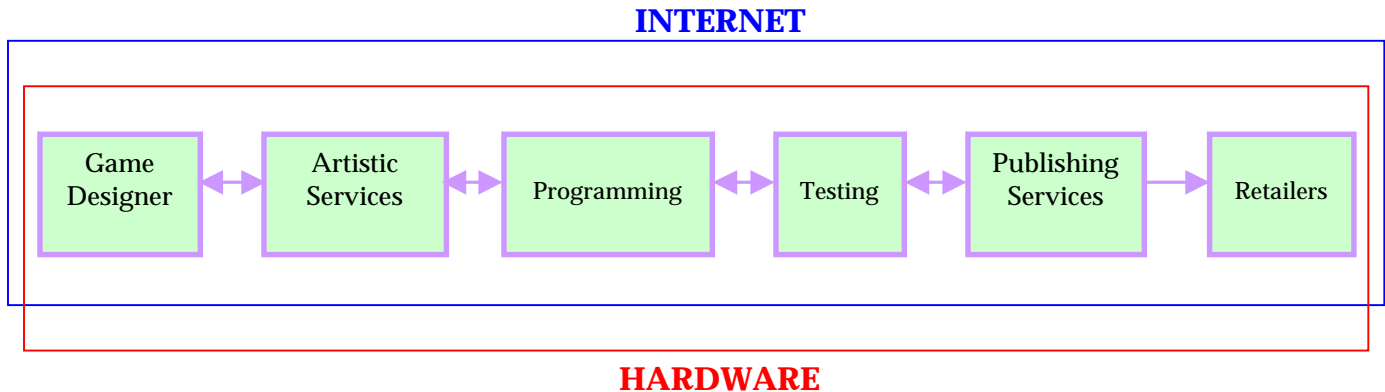


Figure 1

The video game industry value chain is unique in that it is being reshaped by two industry factors. The first of these two factors is the Internet, which is providing new business models and threatening to cut others from the value chain. The second factor is technological advances in hardware, which is threatening to cut the small player out of the picture. Both factors will be discussed at the conclusion of the value chain descriptions. Refer to table 7 at the end of the section for information on salaries earned by persons employed within the first four links of the value chain.

Tools providers (i.e., graphics editing software providers, sound tools providers, etc.) are not mentioned in the following descriptions. While these people play an important role in the video game value chain, there is little to be said about each. Therefore, as you read the following descriptions consider the tools needed to perform value added tasks within each link and the importance of the provider of such tools. Also, while the first four links in figure 1 could be considered as one (because all these value added processes are often performed by the same company) they are listed separately because at times each of these tasks is done by different groups of people. Despite this designation, the words game developers and development process used in the following paragraphs refer to the first four links of the value chain.

GAME DESIGNER ⁷¹

Skills and Training:

- Love for video games
- The ability to coordinate every aspect of multifaceted projects
- Familiarity with every process involved with game development

- Visual imagination
- Writing and sketching skills
- Leadership skills
- Bachelor's degree in art, music, computer science, electrical engineering, and/or cognitive science. (This is a position that is obtained after having worked in one or more of the other links of the value chain, thus allowing diverse educational requirements.)

Game designers write the blue print of the game. They design the mission, theme and rules of the game. Quality is measured by how engrossing a game is. Some say that game designers are storytellers. This is true if you include this twist: they invent the plot, but allow the game player to control the characters and decide the final outcome of the game. The goal of the game designer is to connect with the player. They must design games that players can quickly learn to play, but are hard to master. As is depicted in figure 1 by the two-way arrows, designers work with artists, programmers, and game testers to accomplish this task. Sometimes the game designer may also be a lead programmer or artist, etc.

Development teams usually consist of a lead game designer responsible for the overall game concept, the level designers responsible for interacting with artists and programmers to develop sections of the game, and the writing designer who writes game text and dialogue. Writers might also be responsible for writing manuals and hint books.

ARTISTIC SERVICES ⁷²

In the early phases of game development, artists sketch artwork and draw storyboards that illustrate what the game will look like and how the game will evolve. This artwork consists of background scenery, characters, creatures, icons, vehicles, and any other visual component of game play. All of this concept art work is usually done under the direction of the artistic lead.

Until five years ago, video games largely consisted of 2-dimensional (2D) graphics. Today, the story is quite different. Just about every video game on the market now has some 3-dimensional (3D) graphics in it. When developing graphics for a 2D game, artists draw pictures and scan them into the computer. When developing graphics for a 3D game all artwork is done in the computer. This process has three main components: character artists and animators, background modelers, and texture artists. Sound design is also done during this phase of development.

CHARACTER ARTISTS AND ANIMATORS

Skills and Training (Visual Arts):

- Love for video games
- Visual imagination (must be able to view and create 3D images in their mind)
- Find inspiration in movies, nature, comics, fine art, etc.
- A solid understanding of anatomy, and kinematics (the study of motion)
- A basic understanding of math concepts to aid in the creation of 3D characters and in communicating with programmers
- Proficiency in widely used standard industry tools (i.e. 3D Studio Max)
- Ability to teach oneself new skills
- Formal training in drawing, painting, color theory, sculpture and graphic design (Bachelor's degree in any of these related fields is preferred)

Character artists design (according to the design teams specifications) what the characters and creatures look like. Generally they start by creating sketches of the creature at various angles to get an idea of what the 3D creature should look like (much the same way isometric engineering drawings are done). Typically the artists then use one of two modes for creating the character in the computer. They can either begin drawing the character using special software tools, or they can create the character out of clay and scan it into the computer. When building a character in the computer, the artist starts with simple polygons. By stacking, stretching, and twisting these shapes they can create a skeleton covered with a wire mesh. At this point the artists covers the character with a virtual skin and add color.

Life is given to the artist's creations at the skeletal level. For example, if an animator wants to program the movement of a character's arm, he or she tells the computer how to move the bones in the arm in reference to the rest of the skeleton. The computer then manipulates the skin of the character to go along with the movement. To make sure that this movement is lifelike, animators often study both animals and humans. While making sure that movements are lifelike, it is important not to forget the dramatic aspects of animation. By changing facial expressions and using body language, animators give not only motion to the characters but also personalities.

BACKGROUND MODELERS

Background modelers are responsible for constructing (according to the design teams specifications) the football stadium that you play video-football in, the forest that you hunt video-dinosaurs in, and the haunted mansion you quietly walk through as you search for clues to solve a video-murder. Background

modelers first sketch backgrounds on paper to show a rough model of the design team's proposed layout. The next step is to draw an accurately proportioned version so as to make sure that structures are the right size for the characters. In a 2D game the backgrounds are then drawn in full color and scanned into the computer. In a 3D game, the background modeler constructs buildings and objects using polygons much the same way the character artist constructed the characters. Background modelers are also responsible for background lighting.

TEXTURE ARTISTS

These artists add detail to the surface of all the 3D art in a game. They make a building appear to be made of bricks and add things like rugs to floors and pictures to walls. They may even make a creature's eyes shiny and its skin a dull matte to make it look more lifelike. This process is accomplished by first taking or drawing a picture of the surface they need. The artist then scans it into the computer and wraps it around the object to which it belongs.

SOUND DESIGN

Skills and Training (Sound):

- Love for video games
- Musically Creative
- Spend time listening to all types of music
- Ability to play a musical instrument
- Training in audio engineering, sound mixing, and recording (usually learned through job experience)
- A solid understanding of playback hardware (speakers, sound processors, etc.)
- Formal training in music theory, composition, or film scoring (Bachelor's degree in music is preferred)

Any sound that is heard during game play is created by the games sound designer. This includes not only sound effects, but music and voice as well. Like a good movie score, a good sound design will draw players in and make the game more real. However, unlike movie composers, sound designers don't know exactly what the character will be doing when the music plays. Because of this, their scores must be simpler in order to keep from interfering with dialogue and action sounds. Scores are produced from scratch, while sounds are often modified from an existing CD library of sounds. If designers can't find the sound they are looking for in their library they record it themselves.

PROGRAMMING 73

Skills and Training:

- Love for video games
- Strong math skills (trigonometry, linear algebra, analytical geometry, etc.)
- Knowledge of the programming languages C, C++, and assembly
- The ability to communicate complex ideas in simple terms
- The ability to teach oneself new languages and techniques
- Bachelor's degree in computer science (or sometimes in the fields of cognitive science and electrical engineering)

When a character in a game bumps into a table and knocks a glass of water to the floor, it was a programmer who decided how the water would spill and run onto the floor. Programmers take all the events in a game and translate them into mathematical equations that the computer understands. When these mathematical equations are combined with the input from the player, graphics, music, and sound effects, the end result is “the game.” Specialists on the programming team include: engine programming, artificial intelligence, and graphics, sound and tool programming.

ENGINE PROGRAMMING

Just like a car, an engine is what makes the game run. For example, the graphics engine decides how graphics are stored, recalled and processed. Part of engine programming might include writing an anti-clipping routine that keeps objects from moving through each other in the event of a collision. In order to ensure the highest frame rate for animated graphics, the graphics engine must be optimized. Writing a routine that detects unneeded graphics, such as skin located beneath clothing on characters is one way of accomplishing this.

A good game engine will often be used in many different video games requiring only slight modifications for each, which can save valuable time and money for a project. Although the finished game is the property of the publishing house, game components like the engine are the property of the developer. Items such as a successful and popular game engine can prove to be a powerful bargaining chip for developers when dealing with potential publishers.⁷⁴

ARTIFICIAL INTELLIGENCE

The main role of this group is to write program code to make computer-controlled characters act realistically. As hardware technology advances, so does the need for better artificial intelligence (AI). With every next generation video game platform, gamers not only demand better graphics, they require more

engaging game play. A sure fire way of making a game more engaging is to make the characters with whom the gamer interacts behave more lifelike. AI is at the very heart of this objective.

GRAPHICS, SOUND AND TOOL PROGRAMMING

Graphics programmers work to perfect the playback of animations, while sound programmers work to accomplish the same thing with the game's sound. To add to the games authenticity graphics and sound programmers might add random animations and sounds. Tools programmers write the software used by the artists, animators, sound designers, etc. that are used in the studio to develop games. Often time game developers use off the shelf software (such as 3D Studio Max for art work and animations), but sometimes it is necessary to develop in-house tools in order to accomplish specific tasks. This is the job of the tools programmers.

TESTING 75

Skills and Training:

- Love for video games
- Clear written and verbal communication skills
- Tech savvy (must be able to use database software to record and track game bugs)
- Experience playing many different types of games
- Expert game player
- No formal education required, but may be encouraged to earn computer technician certificates (this is a job often filled by college students that would like to work in the game industry upon graduation)

While this is the lowest paying position in the game development value chain, it is often used as a springboard to move up into other positions within the game development value chain. Basically, testers play video games for a living. It is their job to find all software bugs before the game is shipped to stores. On top of this sometimes-daunting task, game testers also make sure that game play is well balanced and makes sense. If a player spends a week learning to fight a beast and finally defeats it but only receives 3 points, something is not right. Video game testing is done methodically to ensure that nothing is missed. This can involve playing the same game level for hours on end testing every possible game action. Testers must anticipate everything a player will do in order to ensure that a game doesn't crash when the game is played.

Testers must be capable of writing reports that detail all problems found, how they were found, what events in the game lead up to the problem, etc. They must explicitly detail areas of game play that are too hard, too easy or too confusing.

PUBLISHING SERVICES

Auxiliary Services (sometimes found at the development level):

- Producers – help manage the video games budget and schedule
- Intellectual Property Lawyers – help copyright games and secure patents for new development tools
- Market Analysts – identify the video game target audience and seek to find ways to increase it's size; conduct focus groups
- Game Counselors – give tips (usually for a fee) on how to complete certain portions of a game
- Technical Support – answer questions about computer and software problems
- Foreign Language Translators – convert video game text and dialogue to other languages

The relationship that exists between game publishers and game developers is much the same as the relationship between authors and book publishers.

Publishers alone are responsible for printing, merchandising and advertising of games. The relationship that exists between game publishers and game developers is much the same as the relationship between authors and book publishers. The author creates and the publisher edits and merchandises the book. Game publishers are often the owners of different franchises and will approach game developers about making a game using a specific franchise. For example, if a publisher owned the Garfield Comic book franchise, it would look for a game designer good at developing comic themed games. The publisher then sets up some general guidelines to aid the developers in creating the type of game they want. These guidelines might include things such as language and violence content, or even general game parameters (i.e. 2D side scrolling to 3D virtual world). A budget is then set and the game designers begin their task.

During the development process, game developers are paid advances on future game royalties by the game publisher placing all financial responsibilities on the publisher. From time to time a game developer might choose to speculate a game title (fund its own project), in hope of selling it to a game publisher, but this is not common practice due to the financial risk involved. What goes into

the game is ultimately the decision of the publisher. If the publisher wants more blood, then the developer will include more blood. While it is important for the publisher to offer guidance for a final product, they must be careful not to stifle the creative abilities of the development team.⁷⁶

A unique balance of power exists between a game publisher and a game developer. While at first glance it might appear that the publisher holds all the power, developers do have some control over their own destinies. Publishers might control the finances, but developers control the intellectual property. It is in the first four blocks of the value chain shown in figure 1 where the ideas are generated. It is in those links that the game is created. If a developer can create property that they will retain at the completion of the project (such as a new and popular game engine), they won't have to worry about being taken advantage of. Also, when a publisher approaches them to make a sequel title they will have the upper hand at the bargaining table. Even though the publisher controls the financial aspects of game development and stands to make the largest profit from a game, they do not reign supreme over the developer. Much the same way a good author will never have trouble publishing a book, a smart developer will find a way to keep publishers coming back even though they may cost more than another developer.⁷⁷

RETAILERS

As the last link in the value chain the retailer handles all interaction with the consumer. The challenges that video game retailers face are no different from those faced by general retailers. Retailers have limited shelf space for which publishers compete to sell their games. One interesting new development is that retailers have begun to collect used video games from consumers in exchange for store credit. Once a consumer earns enough store credit he or she can trade for a new video game. Retailers then resell the used games to new buyers. Profit margin for a new software product stands at 15 percent, while that for a used product is 40 percent.⁷⁸

Table 7: Salaries of Various Jobs in Video Game Development

Job	Salary
Game Designers ^a	\$35,000 – 75,000 ^b
Artists ^c	\$59,211 ^d
Sound Designers ^e	\$45,000 - 75,000 ^f
Game Programmers ^g	\$59,127 ^h
Game Testers ⁱ	\$13,000 - \$16,000 ^j
<p>^aThe Bureau of Labor Statistics does not have data for game designers, but industry sources suggest their salaries vary widely. The salaries given for game designers were collected through surveying placement companies. Like other entertainment occupations, earnings depend, in part, on worker reputation.</p> <p>^bThis is representative of 1998-99.</p> <p>^cAccording to the Digital and Multimedia Occupational Guide published by the California Employment Development Department, multimedia artists and animators earned between \$25,000 and \$75,000 annually in 1995; art directors earned between \$30,000 and \$100,000. The Bureau of Labor Statistics shows that the average annual salary for artists across all industries is \$34,360.</p> <p>^dA survey taken at the 1999 Computer Game Developers Association conference found that 3-D artists with at least 1 year of experience earned an average of \$59,211 in 1998. Animators earned more.</p> <p>^eThe Bureau of Labor Statistics has no information on sound designers. Many sound designers work on a contractual basis (charging a fee for every minute of their work) and some receive royalties if the soundtrack is released on CD, part of a TV score, etc.</p> <p>^fThese data come from job search agency surveys for an experienced composer.</p> <p>^gAccording to the Bureau of Labor Statistics, computer engineers (both hardware and software) across all industries earned an average of \$59,850 in 1998. Programmers earned an average of \$47,550. The Bureau of Labor Statistics does not collect data specific to the video game industry.</p> <p>^hThese data come from a survey conducted at the Game Developers Conference held in 1999, and reflect the annual salary for a person with more than 1 year of experience.</p> <p>ⁱThe Bureau of Labor Statistics has no data on game testers.</p> <p>^jThese data are figured based on 8-hour work days and 250 working days in a year. The hour rate data was collected from job announcements and usually ranged from \$6.50 to \$8.00.</p>	
<p>SOURCE: GIGnews.com^{79, 80, 81}</p>	

INTERNET

Online gaming has existed for many years. In the day of electronic bulletin boards, users would wait all day to log on one at a time to virtual worlds. In these worlds they could play games, solve puzzles and leave messages for others who electronically visited the world. Even though no graphics were utilized (game play was all text-based) users were easily engulfed into these fantasy worlds. As Internet technology increased, some of these electronic bulletin boards upgraded

Even though there were no graphics utilized, users were easily engulfed into these fantasy worlds.

Play was given to anyone who wanted to play at no charge.

to virtual worlds where all players were able to log on at the same time and interact in a real time text-based environment. These worlds soon became known as MUDs (multi-user dungeon or multi-user dimension). Despite the fact that these games used no graphics they were incredible popular. Game play itself was maintained by players who had retired from playing the game so they could enhance it for others. Players aspired to become wizards (game programmers) where they could be immortalized by growing their electronic worlds with their own lands and quests. Despite the many hours that wizards spent maintaining and enhancing game play, play was given to anyone who wanted to play at no charge.

For the non-MUDer, it was hard to understand the attraction of a MUD in light of so many commercially developed and graphically beautiful games. To the MUDer, it was simple. Interaction with characters capable of an infinite number of reactions to an infinite number of actions performed or words spoken by a player offered far more depth to game play than any graphically beautiful game on the market. In a commercially developed game, every person a player comes in contact with (no matter how beautifully drawn and rendered) has a predetermined personality (AI) and acts in predetermined ways. These computer-controlled characters are only capable of interacting with players on a very limited level. In a MUD, there existed a mix of both player characters (PCs) and non-player characters (NPCs). NPCs had AI and were controlled by the computer. To keep interaction with the NPCs interesting their AI was often changed by the game wizards. PCs were the electronic representation of game players and were controlled by the player to whom the character belonged. His or her character's intelligence was the equivalent of the gamer's own intelligence and his or her strength was equivalent to the skills acquired during game play. PCs were capable of real life emotion and game enhanced actions (characters were capable of casting spells and fighting to the death without any real world consequences). This depth of game play was, and continues to be, possible only when interacting with PCs controlled in real time by another human being.

In the latter half of the 1990's, many games allowed players to connect over the Internet for head to head or cooperative play, but none of this combat took place in the virtual world of a MUD. These online games were little more than a meeting place/chat room where players from all over the world could meet to play games. When done playing, they simply logged off knowing that when they logged on at some future date the game would be exactly as they left it. This all changed in the fall of 1997.

Christmas of 1997 brought a new breed of game to the gamer... Ultima Online.

Christmas of 1997 brought a new breed of game. Ultima Online made its way to store shelves as the first graphical MUD to be commercially developed. Players were now able to play a graphics based MUD - communicating via graphics on a screen instead of text in a telnet window.

Due to the success of Ultima Online, other commercial graphics MUDs have been commercialized. Since the release of Ultima Online, the online industry segment has grown to a point where few can deny that online gaming will play an enormous role in shaping the video game industry. These new multiplayer games encourage a new type of play in which players are encouraged to develop characters in a virtual world. Because this character development takes time, MUDs can be very addictive.⁸²

The Internet is changing the video game industry in the following ways:

- Online games are providing a subscription based business model that can be used to generate continuous revenues for game publishers,
- Cheating in online games is becoming a real concern, and
- The Internet is providing a means through which games can be directly distributed to consumers.

SUBSCRIPTION MODEL

Historically, revenues within the video game industry were generated by the one-time purchase by the consumer of a published title. After making this purchase the consumer/player had everything needed to enjoy every aspect of the game at home. Publishers were often successful at creating more revenues by publishing game expansion modules, game sequels, and game merchandise, but revenues were still generated at the point of sale (POS) only. Online gaming is changing this business model.

In addition to POS revenues, publishers are now able to generate continual revenues on a subscription basis. In order to play an online MUD, players must connect to a central server. Publishers charge gamers a monthly subscription fee in exchange for the privilege to connect to their servers. According to Mark Jacobs, President of Mythic Entertainment in Fairfax, Virginia, "These things can be cash cows. [This] is the only business model that works."⁸³ Despite the fact that most of these games will first be offered on PCs it is doubtful that console makers Nintendo, Sony, and Microsoft will overlook the potential revenues provided by subscription games. As the number of users of next generation consoles grows into the tens of millions,

Sony won't comment on how much they are making from their online game Everquest, but have said profit is generated on the \$3.8 million it receives every month from game subscribers.

subscription games will play a major role in determining the profitability of the industry's major players. Scott McDaniel, vice president of marketing for Sony

The number of online gamers is expected to increase from 20 million in 2001 to 120 million in 2005.

Online Entertainment in San Diego, said, "Online gaming is at the forefront of every large company's business strategy... Subscription-based content is not all that different from magazine publishing."⁸⁴ If a publisher is successful in creating one online MUD, it may never have to develop another game, saving

millions in research and development costs each year.

Sony won't comment on how much they are making from their online game Everquest, but have said profit is generated on the \$3.8 million it receives every month from game subscribers. It is the same story for Origin Systems, maker of Ultima Online, who say they are profiting from its 240,000 subscribers.⁸⁵

According to Datamonitor, the number of online gamers is expected to increase from 20 million in 2001 to 120 million in 2005 and the segment is expected to be \$4 billion industry by 2005.⁸⁶

CHEATING

Cheating was of little or no concern before online video games. Because gamers were only competing against themselves/computer, no one cared if cheating took place. If gamers chose to cheat during game play they didn't hurt the gaming experience for anyone but themselves. Now that gamers are competing against other players in a virtual world environment, the

"Just how serious should you as a developer take the possibility of online cheating? ...If your game is a multiplayer only, the success of your entire product is at stake."

attitude toward cheating has changed. "Just how serious should you as a developer take the possibility of online cheating? ...If your game is a multiplayer only, the success of your entire product is at stake."⁸⁷ The sad truth is that the Internet is full of people who love to ruin the experience for everyone else. Online game tournaments have had to be cancelled due to a lack of credibility stemming from cheaters. These actions result in a decline in the number of players (and with that decline also goes future revenues from game expansions and game sequels) as well as hurting the company's reputation. Cheaters are a detriment to the online gaming community and developers must protect themselves from them. According to Matt Pritchard of Gamastura, cheaters will never go away.

Cheating hit close to home for Pritchard while working on the final stages of Age of Empires II: The Age of Kings (a sequel title to the original Age of Empires).

During the final stages of development for Age of Empires II a tournament was held for Age of Empires I. Online cheating caused the cancellation of the tournament mid-stream due to a lack of credibility in tournament results. As a result, the number of online players fell and the reputation of the development company took a direct hit. Unable to fix the original game properly until after the completion of the sequel, the developers had to endure the anger of players.⁸⁸

Sega tried to stop the cheating by asking players to live up to the true spirit of competition... It didn't work.

Sega, the makers of the Dreamcast, had a similar experience when their first console game went online. Players would try to complete game levels as fast as possible. These times could then be posted to an Internet site as the players' claim to fame. The idea was supposed to foster competition between gamers worldwide in hopes of increasing excitement around the game title. Instead, some gamers found ways of cheating by using special game controllers or by exploiting game flaws. What started out as a good idea soon became a mess of insane scores and angry players. Sega tried to fix the situation by deleting unrealistic scores and asking game players to live up to the true spirit of competition by not cheating. It didn't work and the online community surrounding Sega's first online console game gradually fell apart.⁸⁹

One problem with cheating is that some gamers actually consider it a part of the gaming experience. Companies such as GameShark manufacture devices that are specifically designed to allow gamers to cheat during game play. As was stated before, these types of devices were of no concern to game developers when games were not connected via the Internet. Players could use these devices without any detrimental effect to other players (because one person's game was completely separate from any other person's game). Because many games are now connected via the Internet, use of such devices is no longer innocent, but hurts everyone who is not using a similar device. GameShark recently found cheat codes that work on SegaNet (Sega's online gaming network) enabled games. If GameShark can find codes that work on the Dreamcast, there is no reason that they won't be successful in helping gamers cheat on both the Xbox and the GameCube.⁹⁰

Cheaters are often software hackers that love the challenge of hacking a new game. They will hack a game for no other reason than its existence and then use that knowledge to cheat. Because of this, as a game's popularity increases so do the number of hacking attempts. In other words, the games that are the most popular usually have the largest number of players. These are also the games that stand to lose the most and have the largest number of hackers working against them. Cheating must be considered and addressed by the designers of any online multi-player game.⁹¹

DIRECT DISTRIBUTION

The Internet has not only been successful at connecting players, it has also been successful at connecting players and game developers. In fact, the Internet is allowing many game developers to cut the publisher and retailer out of the supply chain by selling directly to consumers. Because of the way the value chain is currently configured power resides in the hands of the publishers.

If the value chain remains unchanged developers will forever be under the thumb of their publishers... Things are changing.

Publishers control what developers work on what projects. Publishers are they who have well-established relationships with retailers with limited shelf space from which to sell games. Publishers are they who's core competency is to market and merchandise. If the value chain remains unchanged developers will forever be under the thumb of their publishers. But, things are changing.

The video game industry is unique in that it requires no physical goods such as boxes, and printed manuals are required to move the product from producer to consumer. Because of this, developers could use the Internet as a means of digital distribution and cut their links to publishers. As good as this might sound to game developers there are still some obstacles to overcome before this dream will be a reality.⁹²

First, there must be an effective way to protect against the illegal copying of games from one person who has paid for the game to others who have not. To date, regardless of efforts made by developers and publishers, pirated copies of games continue to appear on warez sites on the Internet. Second, in the past few years games have grown in size due to better graphics, music, sound and voice that are now included in almost every game. In order for digital distribution to be feasible, the availability and use of broadband communications must be more widely spread. Third, consumer habits must be overcome. Many gamers like to go to the store, talk with the sales clerks, pick up and read boxes, and finally buy the game and carry home a tangible good. While the Internet cannot entirely replace this, some things can be done to help work around consumer habits. For example, once a game has been purchased and downloaded the company could mail the consumer any game-related printed material that the player would find valuable. Chat rooms might also help to create a sense of social interaction during the purchasing process.⁹³

Obstacles to Direct Distribution:

- ***Piracy***
- ***Availability of Broadband***
- ***Consumer Habits***

Eventually the relative efficiency of Internet distribution will outweigh these obstacles and digital distribution will likely become a reality. When this happens, bargaining power will shift up the value chain into the hands of the game developers.⁹⁴

Despite the obstacles that must still be overcome in order for digital distribution to be accepted as standard industry practice, there are some companies currently using it as their mode of distribution. For more information on this subject see the Direct Model section of this report.

HARDWARE

Many questions surround who the dominant player in the video game industry will be in upcoming years. This year's fourth quarter will bring the release of Nintendo's GameCube and Microsoft's Xbox that will directly compete with Sony's PlayStation 2.⁹⁵ In 1996, the same battle for supremacy was fought between Nintendo, Sega, and Sony. And before that, the same battles had been fought many times over by companies such as Atari, Nintendo, Sega, Collecovision, Neo-Geo, and Intellivision. All of these battles have followed the same cyclical pattern of development. (See figure 2.)⁹⁶

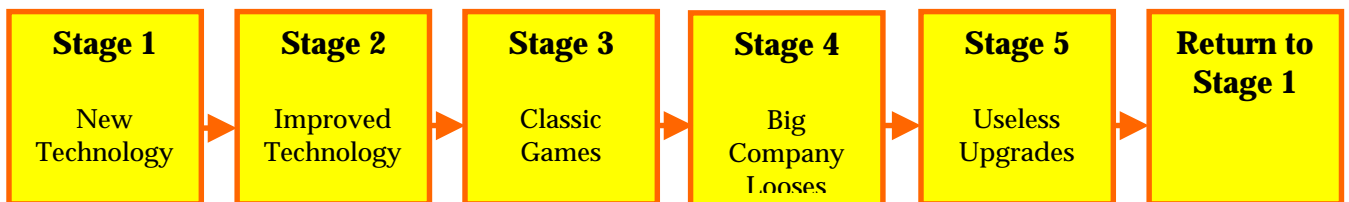


Figure 2

During Stage One, companies introduce new hardware to the market. Sometimes this hardware is revolutionary and sometimes it is the same hardware presented in a new and different way. In the second stage, to compete with new technology, companies that have consoles on the market attempt to make their hardware more competitive by producing peripheral devices. Stage Three is a period of little hardware development and a lot of software development. During this time companies turn their attention away from further development for existing game hardware, and focus on milking all they can from current hardware. In doing so, game play is greatly enhanced through improved programming by people familiar with the hardware. It is also common for a company in the third stage to increase its resource allocation toward its next generation console. Stage Four represents the

All of these battles have followed the same pattern of development... a cyclical pattern.

fact that in every hardware war, one of the industry incumbents makes a mistake and loses market share. During Stage Five attempts to extend the life of current hardware is made by developing system peripherals.⁹⁷

While it is important to take into consideration this entire process when attempting to understand the video game industry, the two most significant happenings in this cycle are found in Stages One and Three. With each new wave of next generation excitement comes new hardware and new games. As time passes, hardware developers increase the power of their machines in order to allow the play of bigger and more complex games. The motivation is to provide the player with a more realistic and captivating experience so as to capture more market share.

The video game industry currently stands ready for the next wave of console hardware that is shaping up to be a costly three-way hardware war destined to speed the convergence of entertainment and computing.

The video game industry currently stands ready for the next wave of console hardware. This new wave is shaping up to be a costly three-way hardware war that's destined to speed the convergence of entertainment and computing, expand the ranks of game players beyond 14-year-old boys and extend Microsoft's reach deep into the consumer market.⁹⁸ But, as any video game insider will

tell you, it's not the console itself that will determine whether or not the system survives, but the games available for it.⁹⁹ And as technology increases so do the costs associated with developing games.

With the cost to develop video games rising as a result of increased computing technology, there has been some speculation as to what will happen to the industry's smaller players. One industry insider said that in 1996 the cost to develop a game was between \$.5 and \$1.5 million, while today the cost to develop a game is upwards of \$3 million. Other insiders have quoted numbers as high as \$5 - \$10 million for a new game and \$.5 - \$1.5 million to port the game to a different hardware platform. In a private interview with three officers of different Utah based game development companies, the following question was asked, "In light of the rising costs of game development resulting from the advancement of hardware, what do you see as the future of small game developers and publishers?" Response varied in exact wording but the theme of each was the same. Developers will not be threatened by the rising development costs as long as they continue to do a good job developing games. Developers bear no financial risk in developing a new game and therefore aren't affected by the rising costs. Small publishers will either be acquired by another company or they will go out

Small publishers simply don't have the resources to develop multiple titles on next generation hardware.

of business because they simply don't have the capital resources necessary to develop multiple titles on next generation hardware.¹⁰⁰

There is a growing demand for simple games.

But the question given to the three officers mentioned above was given in reference to cutting edge games under development for next generation consoles. Despite the fact that most of the industry's attention is on leading edge games being developed for next generation consoles and high end PCs, there is a growing demand for simple games that can be played on WAP enabled cell phones, PDAs, and in desktop browsers. When speaking of simpler games for play on simple hardware platforms, a growing number of small players are achieving success, many using the direct model as a way of distributing their goods. While analysts seem to be neglecting this segment of low end games, the following factors support the speculation of high growth in this segment:

- The number of people using cellular phones and PDAs at work and on the go that have access to the Internet both at work and at home is ever increasing
- The users of such devices are usually constrained by time and are therefore looking for a simple game like Tic-Tac-Toe to pass a brief moment of relaxation over a complex game like chess that requires an entire day to play
- Many members of today's workforce grew up playing video games as children and like to feel as though they are still young and playful
- The increased supply of games and the low price tag associated with these games has spawned many unique games and made them easily accessible
- The Internet has created a way (direct business model that reduces the costs of publishing, marketing and retailing a game) by which players can now market and sell games that started as little more than a hobby
- The Internet has given depth to simple game concepts by allowing people to connect and play head-to-head rather than play against the computer (there is simply a greater sense of enjoyment and accomplishment when you defeat another human being rather than a pre-programmed computer even when the game is no more complicated than Tic-Tac-Toe)
- Because the use of broadband is still limited, the size of games that are downloadable by the general public are limited in size and simple games are generally smaller in size.

(More discussion on simple games and the direct business model used by their developers can be found in the Direct Model section of this report.)

Within three years more people will be using their consoles than their PCs to reach the Internet.

Hardware is not only pushing up the cost of game development, it is also on a crash course with many other consumer electronic and computing devices. The highly anticipated upcoming console war will not only bring the next generation of entertainment into living rooms, it will also offer varying combinations of Internet access, MP3 downloads, DVD-playing capability, and richer, faster graphics.¹⁰¹ This next generation battle is bound to speed up the convergence of electronic entertainment. At the outset, the mission of next generation hardware is to capture the imagination of gamers and enhance game play. By capturing their pixel-eyed audience, hardware companies stand to make hundreds of millions of dollars from game titles. But the real payoff for hardware developers is several years away, when the game console turns into an all-purpose entertainment device, complete with CD and DVD players, Web browsing, and interactive TV.¹⁰² A new report compiled by Datamonitor, a New York based research firm, stated that within three years more people will be using their consoles than their PCs to reach the Internet.¹⁰³

If this is true, hardware developers stand to make considerable amounts of money and will be the driving force behind new Internet browser software and new Internet applications. This could upset the current structure of the Internet and allow for a shift of power from industry leaders to industry startups. Hardware developers could very well become Internet Service Providers stealing away revenues from such giants as Microsoft and AOL. Because of this possibility, the timing of Microsoft's Xbox should come as no surprise. As stated previously, this generation console war will be the first to include the Internet as a part of the console gaming industry. Just as Microsoft bought WebTV Networks in 1997 to further its interests in the Internet¹⁰⁴, it is entering the console gaming market to protect its current interests and capitalize on future growth.

In addition to the speculation surrounding future revenues from Internet-enabled console game systems, some have speculated that the convergence of consumer electronics will eventually upset the entire video game industry. For example, Nintendo currently enjoys a 90 percent market share in portable gaming devices¹⁰⁵, but many feel that cell phones could quickly capture a large portion of the portable game market. Most cell phone games available today are single-player or turn-based parlor or casino-type games like hangman or roulette, designed to be played in short intervals, usually between five and ten minutes, but as wireless technology advances, mobile gaming companies expect to release

Despite the possible disruption of converging consumer electronics, not everyone is sold on the depth of its disruption.

more elaborate multiplayer games -- featuring real-time and persistent action, and location-based features.¹⁰⁶ When this happens, cell phone games will be on par with games that run on Nintendo's Game Boy, Game Boy Color and Game Boy Advanced. Nintendo would be wise to view many upcoming technologies as disruptive.

But David Gosen, managing director of sales and marketing for Nintendo of Europe, dismisses the possible threat to Game Boy's monopoly. "Today's technology does not allow the quality on a mobile that you get on Game Boy Advance," he says. "Snake on a Nokia is not a 32-bit gaming experience, with 32,000 simultaneous colors on screen. They are two different situations. Any kind of convergence is a considerable time away." But others disagree. "For the first time ever Nintendo will meet real competition in the handheld sector," warns analyst Nick Gibson. "There's potential to lose market share - I think there will be convergence. The next 12 months will see the launch of quite a few new mobile gaming services."

Despite the possible disruption of converging consumer electronics, not everyone is sold on the depth of its disruption. Some Utah game developers do not agree with the idea that convergence will upset the industry. Touting such examples as the TV and VCR not upsetting the film industry, they claim to have little interest in the convergence issues. When asked how convergence might affect them directly, they simply said that it wouldn't, stating, "We don't really care what platform wins in the long run. We will develop for whoever is popular."¹⁰⁷

THE VIDEO GAME INDUSTRY IN UTAH

UTAH'S VIDEO GAME HISTORY

As one player within the industry stated, the connections within the video game business are deep, sometimes even described as incestuous, as is characteristic in the entertainment industry in general. Spin-offs, partnerships, and acquisitions are abundant, and the industry in Utah is no different.

Video game development began in Utah in the 1980's with two firms: Access Software in 1982 and Sculptured Software in 1984¹⁰⁸. Access is the maker of Links, the most popular golf game on the PC. Microsoft acquired the firm in April 1999, and recently changed the name of the studio to Microsoft Salt Lake. Sculptured Software initially converted existing interactive games from one computer format to another, but within a few years it was designing its own games. It was acquired by Acclaim Entertainment Inc., a New York based publisher, in October 1995.

Both Access and Sculptured fueled several more companies. A former employee of Access formed Headgate Studios Inc., a development house specializing in golf games, in 1992. Spin-offs of Sculptured included Saffire Inc. in 1994, Avalanche Software in 1995, and Kodiak Interactive Software Studios, Inc. in 1997.

In 1994, three former employees of Evans & Sutherland founded SingleTrac Entertainment Technologies Inc. SingleTrac was the first games company to receive an equity investment from Microsoft¹⁰⁹, who published most of SingleTrac's early games. In 1997, GT Interactive, a New York based video game publisher, acquired SingleTrac and retained the Salt Lake development studio. GT Interactive was acquired by French publisher Infogrames in 1999, who has since ceased operations in Utah. Incognito, another video game studio, was founded in 1999 by 12 employees from SingleTrac.

Electro Brain International Corp., located in Salt Lake City, began distributing Japanese games in the U.S. in the early 1990's and then expanded into development and publishing. The company was a public entity throughout the decade, but has recently left the video games arena.

A former VP of Saffire founded his own game development company, Xantera, in 1998. Because of personal reasons, President Lynn Loughmiller moved the

company from Utah to Paso Robles, CA last year. Alpine Studios, another spin-off of Saffire, incorporated in November of last year.

UTAH TODAY

Utah currently has about nine companies focused extensively on video and computer games. Several executives of local firms place Utah in the top five video game hubs in the U.S., but others in and outside of the state have questioned that placement. Regardless of where Utah and the Salt Lake Valley fall within the gaming community, Utah unarguably has an established presence in development.

Utah currently has about nine companies focused extensively on video and computer games, an established presence in the industry.

As shown in table 8, game software sales in Utah in 2000 were \$179 million, behind only California and Texas. The industry employed 500 people in Utah and paid wages totaling \$34.3 million.¹¹⁰ This equates to an average annual wage of \$68,600 for Utahns working in the industry, which is below the national industry average of \$83,750, but still significantly higher than the average annual wage in Utah of \$28,900. Utah employees in this industry are more productive than in any other state except California, generating \$358,000 in sales per employee.

Table 8: DIRECT EFFECTS OF DEMAND FOR COMPUTER AND VIDEO GAMES ON THE SOFTWARE PUBLISHING INDUSTRY BY STATE, 2000

State	Sales (\$ million)	Employment (thousand jobs)	Wages (\$ million)	Ave. Wage per Employee (\$)	Sales per Employee (\$ thousand)
Arizona	\$124.0	0.47	\$27.5	\$58,511	\$263.8
California	6,847.7	8.56	814.0	95,093	800.0
Colorado	14.9	0.66	48.5	73,485	22.6
Connecticut	5.7	0.36	34.1	94,722	15.8
Florida	9.0	0.84	56.3	67,024	10.7
Georgia	7.7	0.79	69.2	87,595	9.7
Illinois	22.4	1.46	113.1	77,466	15.3
Maryland	45.8	0.50	41.0	82,000	91.6
Massachusetts	72.1	3.28	259.8	79,207	22.0
Michigan	8.7	0.55	38.0	69,091	15.8
Minnesota	5.3	0.44	30.4	69,091	12.0
New Jersey	19.1	0.91	76.8	84,396	21.0
New York	51.8	1.25	117.8	94,240	41.4
North Carolina	39.3	0.36	24.6	68,333	109.2
Ohio	12.7	0.71	40.7	57,324	17.9
Pennsylvania	2.3	0.84	82.3	97,976	2.7
Texas	208.8	1.77	169.6	95,819	118.0
Utah	179.0	0.50	34.3	68,600	358.0
Virginia	6.4	0.77	59.9	77,792	8.3
Washington	154.4	1.16	137.0	118,103	133.1
All Other States	47.9	3.31	194.8	58,852	14.5
All States	7,773.5	29.49	2,469.8	83,750	263.6

Source: U.S. Census Bureau, IDSA member company 10K and 10Q reports, and Nathan Associates, Inc.

The multiple development studios that Utah has amassed have benefited the industry within the state. Virtually all of the Utah game companies are within an hour of the airport, encouraging out-of-state and foreign publishers to visit multiple firms when in the state. The multitude of languages spoken within the state, and thus within many of these companies, is also a valuable asset in the worldwide industry.

Many of the video game companies within the state hire both programmers and artists from the local universities, although some require experience within the industry first. Several local executives agreed that the art graduates from BYU are trained in a style more congruent with the demands of this industry than those from the U of U, although the U of U began offering a degree in Computational Engineering & Science. The number of video game firms and software companies in general within the state provides alternate job opportunities for employees and a larger pool of qualified individuals for employers, benefiting both parties.

Speculation exists as to whether or not employees of Utah video game companies are more affected by the debate on violence and adult content in games than other areas. Some local development studios have bypassed this issue by developing only “Everyone” rated games. Executives from other companies stated that some employees are hesitant to work on certain games because of content, but that in most instances their preferences can be met.

Following are profiles for each video game company in Utah.



2144 S. Highland Drive
 Second Floor
 Salt Lake City, UT 84106
 Tel: (801) 486-2222
www.acclaim.com

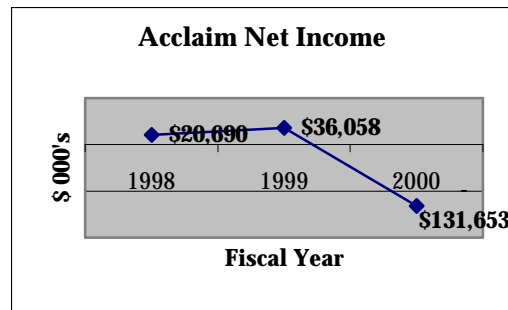
VP/Gen Mgr: Chip Luman

Acclaim Entertainment, Inc., founded in 1987 and based in Glen Cove, NY, is a leading worldwide developer, publisher and mass marketer of software for Nintendo, Sony, Sega, and Microsoft consoles and the PC. The company has implemented a brand strategy around six key brand categories including: Acclaim Sports (NFL Quarterback Club, All-Star Baseball), Acclaim Max Sports (Dave Mirra Freestyle BMX, McGrath vs. Pastrana, Jeremy McGrath Supercross), Club Acclaim (Dualstar Entertainment's Mary Kate and Ashley, Bust-A-Move), Acclaim Racing (Ferrari, Vanishing Point, ATV: Quad Power Racing), Action (Turok, Fur Fighters, ShadowMan), and Acclaim Ring Sports (HBO Boxing, Extreme Championship Wrestling). Acclaim has also established its own online division, Acclaim Online. The company directly distributes to more than 50,000 stores in more than 50 countries worldwide.

The studio in Salt Lake, one of four owned and operated by Acclaim in the U.S. and the UK, was established in 1995 when Acclaim acquired Sculptured Software. With 65 employees, the studio has two teams, but will soon expand to three teams.

Performance Measures	
Sales (ttm)	\$167.7M
Sales Growth (FYE 2000)	-56.2%
Profit Margin (ttm)	-31.0%
Net Income (FYE 2000)	-\$131M
Return-on-Assets (ttm)	-63.8%
Total Liabilities	\$159M
Debt-to-Equity (mrq)	N/A
Return-on-Equity (ttm)	N/A
Price-to-Earnings	N/A
Market Capitalization	\$255.4M
Stock Price (20 July 2001)	\$3.97
# of Employees (worldwide)	600
# of Employees (SL)	65

Source: Yahoo! Finance (AKLM)



Alpine Studios, Inc.



Alpine Studios, Inc.
599 S. 500 E.
American Fork, UT 84003
Tel: (801) 772-0313
Fax: (801) 756-4564
www.alpine-studios.com

Co-founders: Ross Wolfley, Les
Pardew

Quick Facts

Sales (FYE 2000)	N/A
Sales Growth (FYE 2000)	N/A
Credit Rating	N/A
# of Employees	13
Source: U.S. Business Directory	

Alpine Studios was incorporated in November 2000 with the mission of developing mainstream, non-violent games. The company is currently working on two internal games, one for the PC and the other for the PlayStation 2. Alpine employees have expertise on PlayStation One, PlayStation 2, Game Boy Color, Game Boy Advance, GameCube, and the PC.

The company has created a development system called STARTACC for Standards, Tools, Architecture, Research, Testing, Access, Creativity and Customer service that allows for creativity and flexibility while maintaining process integrity.



102 W. 500 S. #502
Salt Lake City, UT 84101
Tel: (801) 595-1020
Fax: (801) 595-1140
www.avalanchesoftware.com

Owner: James Henn
CFO: Bill VanOverbeck

Quick Facts	
Sales (FYE 2000)	\$5-10M
Sales Growth (FYE 2000)	N/A
Credit Rating	Good
# of Employees	65-70
Source: U.S. Business Directory	

Avalanche Software was founded in 1995 by four lead programmers from Sculptured Software. The company originally ported existing games to console platforms, but has since created a set of proprietary tools that enables the development of original games on multiple platforms.

Avalanche has created games for every major console and is currently working on PlayStation 2, GameCube, and Xbox games and an original game in the action/role-playing genre. Past games include Ultimate Mortal Kombat, NBA Showtime: NBA on NBC, NFL Blitz 2001, and Rugrats in Paris. The company has worked with the publisher Midway for many of its titles.



370 E. South Temple, Suite 500
Salt Lake City, UT 84111
Tel: (801) 531-8500
www.beyondgames.com

CEO: Kris Johnson
VP: Clark Stacey

Quick Facts

Sales (FYE 2000)	N/A
Sales Growth (FYE 2000)	N/A
Credit Rating	Good
# of Employees	28

Source: U.S. Business Directory

Beyond Games, formed in 1992 by Kris Johnson, develops both original and licensed game titles for next generation consoles. The company has created a proprietary toolset to which they attribute the volume of top-quality work their relatively small team generates. The company's first release, BattleWheels for the Atari Lynx, won the 1993 Consumer Electronics Show Innovations Award. Beyond Games has the goal of ultimately producing two top-quality titles per year while keeping pace with the latest technology. Other completed titles include Motor Mayhem published by Infogrames and Redline.

Currently the group has 28 employees, but expects to have between 35 and 40 by the end of September. Two project teams are presently working on multiple-platform games for the PC, PlayStation 2, GameCube, and Xbox.

The owners of Beyond Games have recently founded another gaming company, Cobalt Interactive, focusing on branded games for targeted marketing vehicles.



1564 S. 500 W. Suite 200
Bountiful, UT 84010
Tel: (801) 298-3800
Fax: (801) 298-9169
www.headgatestudios.com

President: Vance L. Cook

Quick Facts	
Sales (FYE 2000)	\$1-25M
Sales Growth (FYE 2000)	10-50%
Credit Rating	N/A
# of Employees	14
Source: Email correspondence with Headgate employee	

Spinning-off of Access Software in 1992, Headgate Studios specializes the development of golf games for the PC. The company has recently teamed up with Electronic Arts Sports division to develop the Tiger Woods PGA tour franchise.

Headgate has also worked with the publisher Sierra Sports on the PGA Championship Golf franchise. It has also published its own software for a calculator. Headgate currently has one development team creating a title for the PC.

Incognito Studios

136 E. South Temple
Salt Lake City, UT 84111
Tel: (801) 533-0756
www.incognitostudio.com
CEO: Scott Campbell

Quick Facts	
Sales (FYE 2000)	N/A
Sales Growth (FYE 2000)	N/A
Credit Rating	N/A
# of Employees	46

Source: U.S. Business Directory

Incognito, formed in 1999 by several employees from Singletrac Entertainment, has grown to become one of the best-known studios in Utah. The company is a first-party developer for Sony currently creating two titles for the PlayStation 2 in its two development teams.

The company, with Sony, has developed all three games in the top-selling Twisted Metal series. When the original Twisted Metal game was released in 1995, the development team was credited with establishing car combat as a whole new genre within the video game industry. Twisted Metal 2 was released to critical claim in 1997 and remains one of the best-selling games of all time, with almost two million units sold in North America by the end of 2000. Overall, the Twisted Metal franchise has sold close to five million units in North America, making it the best-selling car combat series ever. Twisted Metal Black was released this summer.



4001 S. 700 E. #301
Salt Lake City, UT 84107
Tel: (801) 266-5400
Fax: (801) 266-5570
www.kodiakgames.com

CEO: Jonathan Slager

Quick Facts

Sales (FYE 2000)	\$20-50M
Sales Growth (FYE 2000)	N/A
Credit Rating	Good
# of Employees	80

Source: U.S. Business Directory

Kodiak Interactive Software was founded in 1997 by George Metos, who had previously formed Sculptured Software. The company, a full service interactive entertainment software development studio focused on the creation of state-of-the-art original games for all leading hardware platforms, has grown to become a respected developer within the industry. More than 20 million units of Kodiak-developed games have been sold.

Kodiak is best known for developing such console titles as Mortal Kombat 1, 2, and 3 for Sega Genesis and The Empire Strikes Back and Doom for Super Nintendo. The company is currently working on a chariot racer, Circus Maximus, for PlayStation 2 and Xbox.



123 Wright Brothers Dr.
 Suite 200
 Salt Lake City, UT 84116
 Tel: (801) 257-6300
 Fax: (801) 257-6329
www.microsoft.com/games
 General Manager: Dave Curtin

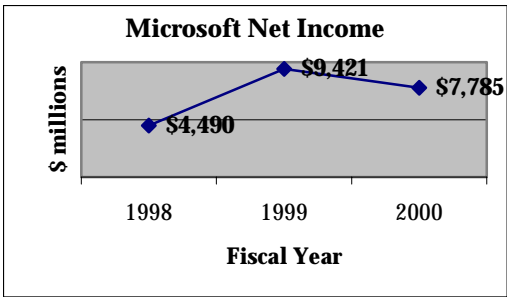
Microsoft Corporation develops, manufactures, licenses and supports a wide range of software products for a multitude of computing devices. Microsoft software includes scalable operating systems for servers, PCs and intelligent devices, server applications for client/server environments, knowledge worker productivity applications, and software development tools. Microsoft also licenses consumer software programs, sells hardware devices, provides consulting services, trains and certifies system integrators, and researches and develops advanced technologies for future software products.

Microsoft has a strong history in PC game development and publishing beginning with Flight Simulator in 1982, which sold more than 1 million copies. The company has published games such as Age of Empires and Links in several genres including simulations, sports, role-playing, online, and strategy. The Xbox, available November 8th, marks the company's entrance into the console market.

The studio in Salt Lake was established in 1999 when Microsoft acquired Access Software. Microsoft Salt Lake currently has about 110 employees.

Performance Measures	
Sales (ttm)	\$25.3B
Sales Growth (FYE 2000)	-14.0%
Profit Margin (ttm)	30.5%
Net Income (FYE 2000)	\$7.79B
Return-on-Assets (ttm)	13.56%
Total Liabilities	\$8.8B
Debt-to-Equity (mrq)	0
Return-on-Equity (ttm)	16.89%
Price-to-Earnings	52.25
Market Capitalization	\$390.6B
Stock Price (20 July 2001)	\$69.18
# of Employees (worldwide)	39,100
# of Employees (SL)	~110

Source: Yahoo! Finance (MSFT)





734 E. Utah Valley Dr.
American Fork, UT 84003
Tel: (801) 847-1400
Fax: (801) 847-1401
www.saffire.com

President: Hal Rushton

Quick Facts	
Sales (FYE 2000)	\$2.3M
Sales Growth (FYE 2000)	N/A
Credit Rating	Satisfactory
# of Employees	110 (Am. Fork) 25 (St. George)
Source: U.S. Business Directory, S&P's Register of Corporations	

Saffire, Inc. was founded by former employees of Sculptured Software in 1994. Headquartered in American Fork, the company also has studios in St. George, UT and Spain. Saffire has developed and continues to develop for all major hardware consoles, specializing in the design and manufacture of sophisticated 3-D rendering engines used in state-of-the-art video games.

Saffire has created games for major publishers Red Storm, Konami, Nintendo, Electronic Arts, Lego, and Midway. Included in its repertoire of games are Tom Clancy's Rogue Spear, multiple Oddworld titles, StarCraft: Brood War, and Cyber Tiger.

SURVEY RESULTS

A survey was sent via email to over 100 companies within the video and computer game industry. Among the 16 respondent companies, 69 percent were private, 31 percent public. Over 70 percent of respondents were an owner/partner/principal, a member of the executive team, or a general manager. Three-fourths of the companies had less than 500 employees. 2000 revenues ranged from less than \$1 million to over \$5 billion, but over two-thirds recorded less than \$25 million. Annual revenue growth varied widely, from negative growth to over 200 percent, but most companies realized positive growth, with over 60 percent in the 10 to 100 percent range. Forty-four percent of respondent companies are currently pursuing venture capital or have pursued it in the past, and only 19 percent are currently planning to expand or relocate within the next year. (See Appendix 1 for complete results.)

The respondents were asked to rank on a scale of one to five, one being not important and five being very important, the value of 14 different criteria in potential expansion or relocation decisions. The criteria were:

- Locally available customers and suppliers
- Locally available research institutions and universities
- Locally available, highly skilled technical labor force
- Cost of living considerations
- State business incentives
- State taxes
- Geographic location
- Locally available professional service resources
- Locally available capital resources
- Quality of local transportation infrastructure
- Close proximity to a major urban center
- Quality of life
- Close proximity to competitors
- Close proximity to leading firms

A locally available, highly skilled technical labor force resulted in the greatest consensus among respondents, with 94 percent giving a rating of 4 or 5. Research institutions and universities were somewhat important, with 41 percent of respondents giving a ranking of 4 and another 18 percent a 5. Quality of life seems to be fairly important with all respondents providing a ranking of at least 3 and 47 percent labeling it “very important.” Respondents were somewhat split on cost of living considerations, although 65 percent gave a ranking of at least 4. Locally available customers and suppliers seem to be fairly unimportant in this

industry, as over three-fourths of respondents gave a ranking of 1 or 2. Almost half (47 percent) of respondents stated that state business incentives are “very important,” and 59 percent ranked state taxes as a 4 or 5. Eighty-eight percent of respondents ranked geographic location 3 or 4. Locally available professional resources have some importance, with 41 percent of respondents giving a 4 rating. Forty-one percent of respondents gave the quality of the local transportation system a 3. Locating near a major urban center is an important, but not the most important, factor, with 41 percent of responses at 4 and another 18 percent at 5. Close proximity to competitors and leading firms may not be critical in this industry, with 88 percent and 82 percent of respondents, respectively, giving a ranking of 3 or less.

A locally available, highly skilled technical labor force resulted in the greatest consensus among respondents, with 94 percent giving a rating of 4 or 5.

When asked to rate Utah’s overall technology business environment, 53 percent gave an “average” rating, 33 percent gave a “strong” rating, and 13 percent gave a “weak” rating.

Utah currently has many of the elements important to companies within the video game industry, including a skilled workforce, local universities, a high quality of life, and a reasonable cost of living. Quality programs at local universities supplying a skilled workforce, cost of living, and quality of life/outdoor recreation activities were the most common responses among respondents as Utah’s strengths, while perceptions of the local culture as closed and non-diversified, lack of tax incentives, and little local venture capital were repeated as weaknesses. When asked to rate Utah’s overall technology business environment, 53 percent gave an “average” rating, 33 percent gave a “strong” rating, and 13 percent gave a “weak” rating. Only half of the respondents commented on Utah’s strengths and weaknesses, with several stating they did not have sufficient knowledge of Utah to respond. The state will need to promote its offerings to those within the industry before a large number of companies will relocate here.

ACADEMIC PROGRAMS AND RESEARCH

Because a highly-skilled, technical labor force is vital to the video game industry, programs of study and research conducted at local universities in related fields is pertinent in an industry analysis. Below is current information on both departments and research at the University of Utah, Brigham Young University, and Utah State University.

THE UNIVERSITY OF UTAH SCHOOL OF COMPUTING¹¹¹

University of Utah, School of Computing 50 S. Central Campus Dr. Rm 3190 Salt Lake City, Utah 84112 (801) 581-8224

FACTS AND STATISTICS¹¹²

Student population:

- 350 undergraduates enrolled in Computer Science major
- 50 undergraduates enrolled in Computer Engineering major
- 56 graduates enrolled in Computer Science MS program (June 2000)
- 56 graduates enrolled in Computer Science PhD program (June 2000)

RESEARCH PROGRAMS

The School of Computing currently has \$9 million in research expenditures. Its research philosophy emphasizes:

- Theory to practice
- Large-scale projects
 - Team projects
 - Tech transfer of results

Research is conducted in the following intellectual areas:

- Computer Graphics and Visualization
- Computational Science and Engineering
- Systems and Languages
- Architecture
- Formal Methods for System Design

- VLSI and Asynchronous Circuits
- Artificial Intelligence and Robotics
- Immersive Environments

TIMELINE

The Department of Computer Science was founded by three Electrical Engineering faculty members in 1965. The number of faculty reached 10 by 1985 and then doubled to 20 by 1996. The School of Computing was created in 2000 and, if current growth projections are accurate, will have 30 faculty members by 2005. (For a more complete history, see Appendix 2.)

NEW GRADUATE DEGREE: COMPUTATIONAL ENGINEERING & SCIENCE¹¹³

On January 12, 2001, the Utah Board of Regents approved a new Masters of Science program in Computational Engineering and Science (CES), to be jointly offered by the School of Computing and the Departments of Physics and Mathematics. The program should augment the local labor pool as it relates to gaming and graphics jobs in industry.

<p>Contact: Dr. Christopher Johnson Director, Scientific Computing and Imaging Institute MEB 3490 crj@cs.utah.edu</p>
--

"Our program responds to the tremendous growth in computer technology and the great improvements in computational algorithms. These have allowed the computers to solve previously intractable problems from science and engineering. Students in this program will be well-prepared to work on scientific computing and engineering problems to solve the critical needs of society," said, Professor Kris Sikorski, who will serve as the program's first director.

SCHOOL OF COMPUTING INDUSTRY PARTNERING PROGRAM¹¹⁴

Similar to Stanford's very successful Industry Affiliates program, the School of Computing actively courts companies as partners. Several ways to establish medium or long-term relationships follow.

<p>Contact: Ann Torrence 801-581-7631 torrence@cs.utah.edu</p>
--

Meet (and hire) students:

- Sponsor a senior capstone course project
- Offer a colloquium on a topic of interest in computing
- Sponsor an undergraduate internship
- Sponsor a graduate student working directly with a faculty member on a project of interest

- Sponsor a graduate fellowship
- Formally recruit on campus and participate in job fairs
- Engage in research activities
- Hire faculty as consultants (if a firm has a larger need, faculty can and often do perform private contract work as part of their research capacity)

Partnerships with a broader, long-lasting impact:

- Donate equipment or software for teaching or research labs
- Establish a named endowment or other honor to support scholarships, professorships, laboratories or lecture series

INSTITUTES & CENTERS

Some of the University of Utah faculty members conduct their research through formal, freestanding Institutes and Centers within the School of Computing.

Scientific Computing & Imaging Institute:

- NIH NCRR Center for Bioelectric Field Modeling, Simulation, and Visualization
- DOE Advanced Visualization and Technology Center (AVTC)
- Utah State Center of Excellence for Scientific Computing and Imaging

NSF STC for Computer Graphics and Scientific Visualization Research Centers with SC faculty Collaboration:

- Center for the Simulation of Accidental Fires and Explosions (C-SAFE)
- National Computational Science Alliance (NCSA)

COMPUTER SCIENCE DEPARTMENT, BRIGHAM YOUNG UNIVERSITY¹¹⁵

COMPUTER-AIDED GEOMETRIC DESIGN

Current research topics in computer-aided geometric design include non-uniform Catmull-Clark surfaces, implicitization methods for rational curves and surfaces, reversible Free-Form Deformation, and automatic algorithms for image morphing. This last research topic is closely coupled with current work in the department's computer graphics and image processing groups on image-based modeling and rendering and surface reconstruction for medical imaging. The group has

<p>Contact: Dr. Tom Sederberg 3374 TMCB 378-6330 tom@cs.byu.edu</p>
--

research labs in the Center of Excellence for Research of Interactive Visual and Imaging Technologies (RIVIT).

COMPUTER VISION AND IMAGE UNDERSTANDING

Research in Computer Vision and Image Understanding deals with algorithms and techniques for extraction, recognition, and high-level description of information contained in multi-dimensional signals, notably images. As the acquisition, storage, display, manipulation, and use of images by computers becomes increasingly more common, tools are needed to deal with digital image information. Application areas include: 1) document understanding with text, graphics, and image recognition; 2) scanning, enhancement, compression, and recognition of genealogical microfilm; 3) recognition and visualization of two- and three-dimensional medical anatomy; 4) terrain modeling and automated creation of virtual environments; 5) intelligent, interactive tools for image segmentation; and 6) multi-scale image analysis representation. The group has research labs in the Center of Excellence for Research of Interactive Visual and Imaging Technologies (RIVIT).

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378-3027
barrett@cs.byu.edu

COMPUTER GRAPHICS

The Computer Graphics Research Group is currently conducting research in several areas of 3-D computer graphics, including object-oriented graphics, physically-based modeling, animation, virtual reality, image-based modeling and rendering, and photorealistic image generation. New techniques and algorithms are being explored in an attempt to produce higher quality images more efficiently, and to provide interfaces to the graphics capabilities that are much simpler to use than those currently available. The research lab is equipped with state-of-the-art computer graphics workstations as well as equipment for outputting images on film and video. The group has research labs in the Center of Excellence for Research of Interactive Visual and Imaging Technologies (RIVIT).

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HYPERDIMENSIONAL COMPUTER GRAPHICS

The objective of the Hyperspace Research Group is the meaningful pictorial presentation of more than three simultaneous variables. Often, more than three simultaneous variables must be considered in situations, which range from

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science and engineering through defense and business. The group is extending the adage “a picture is worth a thousand words” to higher dimensions, making it possible to grasp situations as wholes and to think creatively about solutions. The Hyperspace Research Project is the CS Department's oldest research project. Beginning in 1975, the group has continuously pushed forward the frontier of Cartesian Hyperspace Graphics. By-products include four-dimensional motion pictures and four-dimensional holograms. Recent research and developments include n-dimensional fractals and hyper-dimensional graphics techniques using parallel axes, planes and volumes.

UTAH STATE UNIVERISTY COMPUTER SCIENCE & SUPPORTING PROGRAMS¹¹⁶

HISTORY AND STATISTICS

The BS degree in Computer Science was approved in 1964. A master's degree program (plan B) was approved in 1980, and the first candidate graduated in March 1983. A plan A master's degree program was approved in November 1984. There are currently about 100 graduate students in Computer Science. In June 1995, the Computer Science department awarded 25 master's degrees and 30 bachelor's degrees.

Contact:

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Computer Science Dept,
USU UMC 4205
Logan, UT 84322-4205
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(435) 797-3280
larre@cs.usu.edu

The current Computer Science faculty at Utah State consists of 12 full time tenure track members and 2 lecturers. The Master of Science in Computer Science program is supported by a wide variety of graduate courses in areas such as: artificial intelligence, database management systems, compiler construction, modeling and simulation, graphics, information systems, operating systems, programming languages, software engineering, digital signal processing, computability, automata theory, automatic software generation, administration of computing, and complexity. The research interests of the faculty cover a wide variety of areas and are both of a theoretical and an applied nature. Supporting courses from other departments are also utilized in the graduate program.

Research activities in computer graphics at USU are of a relatively small scale, but some efforts do exist in Computer Graphics applications, Ray Tracing, Ray Tracing through non-isotropic media, Computer Graphics applied to Relativity, and Simulation of Physical Phenomena. On the upside, the school holds and annual CS camp.¹¹⁷ High school students from Utah, Idaho and Wyoming are invited to the USU campus for a two-day Computer Science Camp. The camp is held annually in September. Some topics covered are: Programming

Environments, Image Processing, Evolving Computer Programs, Graphical Images, Multimedia, and World-Wide Web access and programming. On the basis of a competition held during the camp, a number of academic computer science scholarships are awarded.

The USU Business Incubator,¹¹⁸ a Research and Technology Park program, supports new business development by providing business incubator services to fledgling companies on an "at cost" basis. Incubator services include a receptionist, secretarial support, shared office equipment, offices, conference room, business development consulting, and networking to financial, marketing and management contacts.

Contact:

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Research Park
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UTAH CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

The video game industry is unique in many aspects and varies greatly from traditional high-tech industries. For most high-tech industries the segment of the value chain where value is added is usually the most profitable. This is not the case with video games. Developers in the video game industry add the most value, creating a game from nothing, but it's the publishers that make the majority of revenues from game sales. In light of this fact, and for want to increase state revenues, it would seem logical to focus on recruiting publishers to the state. But again, the industry does not work in such fashion. In the U.S., the large publishers are fairly concentrated on the East and West coasts and rarely expand or relocate except sometimes through acquisition. This acquisition mode of expansion should be viewed as both a potential growth opportunity through which publishers will gain equity interests in Utah, and a potential threat to the existing Utah development cluster. The acquisition of Utah developers could prove to be nothing more than the transplanting of development companies out of the state.

Building a hub of development studios is also not a clear-cut decision. As with any company, growth strategies for a developer include an IPO or acquisition by a larger firm. Again, while an acquisition may aid the state in attracting publishers, it could also be the demise of the current Utah game development cluster. The better choice would be to have a developer go public. This way the state could maintain ownership of its firms while realizing greater revenues. Unfortunately, it is not common industry practice for game developers to IPO. If a firm has obtained enough capital and enough intellectual property to publish and sell its own games then it can go public, but this is rare. The only reason a developer would have to IPO is to create revenues so it could fund game development internally and possibly publish its own titles. Because this type of action would require a shift in the way developers do business and possibly sever ties to publishers who historically assume all financial risks, it is uncommon for a developer to IPO. Developers would not only assume all financial risk on game titles but would be required to obtain new skills in the areas of marketing, merchandising, manufacturing, and retailing. In addition, new publishers would be required to compete with the large, established firms for shelf space in retail outlets. An additional complication in getting developers to a point where they can IPO is that venture capitalists have thus far not played a large role in this industry. This difficulty with VCs is due to the two-year lag

time on any sort of return and a lack of understanding of industry dynamics on the part of the VCs.

An additional factor has made it difficult for Utah game development to grow. Most of the world has no idea what to think of Utah in the context of high-tech and what opinions they do have are based on stereotypical “Mormon” culture. Nine of the 12 non-Utah based survey respondents did not list Utah’s strengths or weaknesses, several stating that they did not have sufficient knowledge of the state to answer those questions. Companies and potential employees will not move to Utah if they are not aware of the video game and other high-tech companies here or the role the government is taking to support these companies. Also, many local executives within the state expressed some difficulty in attracting employees to the state because of an outside perception that Utah has a low tolerance level and a “lack of political, cultural, racial, and thought diversity.” An owner of a California publisher listed Utah’s “weird local culture” as a weakness for the state and the general manager of a local company stated that recruiters routinely tell him that Utah is a harder sell than other states.

RECOMMENDATIONS

While it would be great to have a single pronged, focused attack plan for developing the video game industry in Utah, this is simply not possible. The key is neither to focus on developers nor publishers, but to focus on growing a presence in both simultaneously.

PRONG #1

If Utah is to grow its presence in video games it must begin by building upon what it already has. Utah must focus on building up existing game development within the state rather than attracting publishers to the state. This isn’t to say that Utah should ignore game publishers. Game publishers currently play an important role that, if overlooked, would cause everyone involved to suffer. Utah’s focus must be on in-state activity. In other words, help game developers to grow and foster their relationships with out-of-state publishers and if an opportunity to have a game publisher in the state presents itself, take advantage of it. However, it is critical that current Utah video game activity take precedence over any recruiting activities.

A skilled and trained workforce is critical to the growth of any high-tech firm and game development is no exception. More trained employees means firms with larger workforces able to take on more projects. A large, well-trained workforce can also help to increase the number of startups. The end result is the same in either case: the state will enjoy increased revenues and the industry will grow.

Below is a strategy for better training the work force already in the state, followed by a strategy for growing the number of trained people overall.

The best way to better train the work force is to strengthen all existing programs at local universities in computer science, computer graphics, and art. Making and strengthening ties between University programs and local businesses will accomplish this task.

By strengthening ties between University programs and local business, the programs will become better suited to meet local labor needs. By getting local companies involved in the education of Utah college students, graduates will already have ties to local companies and will be more likely to stay. Several local executives within the industry suggested that placing a greater emphasis on computer programming, graphics, and art in the local universities would encourage growth in video games. The recent addition of a degree in computer engineering at the U of U may facilitate this process. One local CEO who has traditionally hired more experienced programmers rather than fresh graduates expressed an interest in affiliating with that department now, possibly sponsoring co-ops with students. Graduates then have more experience and are more valuable assets.

To help grow the size of this trained labor pool the state must achieve Governor Leavitt's goal of doubling and later tripling the number of engineering graduates from local universities. To best accomplish this task programs must be put in place that encourage children to pursue engineering at grade school levels.

Video games and computers are an easy sell to most youth. When first exposed most youth are intrigued by them, but later are discouraged by the complexity of studying them and loose interest. Programs aimed at encouraging interested students must be put in place during primary schooling if Governor Leavitt's goal is going to be reached.

As mentioned before, a side effect of growing the number of trained people in the state will be more local startup companies. Utah must do everything it can to foster the growth of small startup developers. By helping new companies to survive, the state will benefit from an influx of new ideas and a growth in its industry presence.

PRONG #2

At first glance it would appear that Utah doesn't have the headquarters of a video game publisher within its state boundaries. While this may be true, there are experienced software publishers in the state. Microsoft successfully ventured

into the video game market in the late 1990's, and nothing prevents Novell from being just as, if not more, successful.

Novell, the state's largest software developer and publisher, should begin publishing video game titles. Novell is famous for its business software applications. Currently, all software published by Novell was developed in house. While it might be possible for Novell to develop video game titles in house, they may be more successful at least initially working with an outside game developer. We formed this opinion based on two simple facts:

1. Novell is experienced in publishing and launching new software.
2. There are many experienced game developers with established reputations located close to the Novell campus.

If Novell were both financially able and willing to fund a few initial video game titles with local developers they could see huge returns (depending on the success of the title) within two to three years. Novell could then branch out and begin publishing titles from developers all over the world.

SUPPORTING ACTIVITIES

To help ensure the success of the above listed recommendations there are other activities in which the state must invest its time. Specifically, Utah must do all it can to show that it is tech savvy and capable of supporting a diverse culture.

To accomplish this Utah must market its existing presence in game development along with Utah's general strength in software development and its association to video game history (the birth place of Atari's founder). Awareness of Utah's high-tech activities and, more specifically, its presence in the video and computer game industry, needs to grow among individuals and companies within the industry.

To aid in recruiting efforts of potential employees and companies, Utah must focus on its current level of diversity and the recreational activities that exist within the state. By actively branding the strengths of the state, outsider perceptions will change, making Utah a more attractive location and an easier place to recruit people to.

To ensure that Utah can take full advantage of a booming in-state video game industry, it must build the availability and usage of broadband Internet connections. By doing so, the state will be positioned to take advantage of emerging business models such as the subscription model and the direct model. In the case of Novell becoming a game publisher, continual subscription

revenues mean a monthly influx of large sums of money to the state. In addition, a well-developed broadband backbone will allow the state to take full advantage of developers making money through direct sales of video games. The state must do anything within its power to help game developers take advantage of the direct business model. Because the state has a strong presence of game developers, Utah stands to gain from the direct business model. In light of this, the state should initiate programs to help developers overcome piracy and established consumer habits so that these additional state revenues can be realized as soon as possible.

TARGET COMPANIES

PUBLISHERS

Following are company profiles for the five largest publishers based on sales revenue. All are recognized and respected leaders in the industry. The companies have various growth and development strategies, some aggressively acquiring while others take a more internal approach. Most of the companies saw negative sales growth in 2000, as was typical for the industry, but all are on target for capitalizing on the console wars later this year. Although these companies are not likely to relocate or even expand to the state or any other location, the possibility exists that they will acquire a Utah based firm in the future. Developing a relationship with these leaders will increase the likelihood of their continuing operations in Utah should such an acquisition occur.



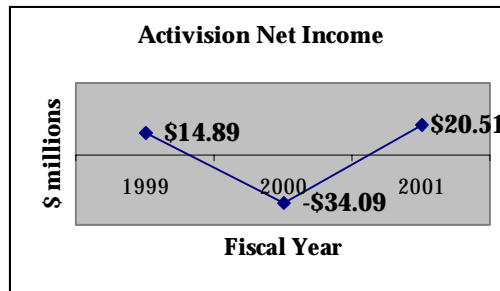
31 Ocean Park Blvd.
 Santa Monica, CA 90405
 Tel: (310) 255-2000
 Fax: (310) 479-4005
www.activision.com
 CEO: Robert Kotick

- Became the first third-party developer/publisher in 1980
- One of the top three independent video and computer game publishers in the world

Performance Measures	
Sales (ttm)	\$620.2M
Sales Growth (FYE 2000)	34.15%
Profit Margin (ttm)	8.38%
Net Income (FYE 2001)	\$20.5M
Return-on-Assets (ttm)	6.25%
Total Liabilities	\$178.7M
Debt-to-Equity (mrq)	.41
Return-on-Equity (ttm)	14.88%
Price-to-Earnings	50.66
Market Capitalization	\$1.13B
Stock Price (24 July 2001)	\$33.34
# of Employees	764

Source: Yahoo! Finance (ATVI)

Activision, Inc. (ATVI) is an international publisher, developer and distributor of interactive entertainment and leisure products. The company's products span a wide range of genres (including action, adventure, extreme sports, racing, strategy and simulation) and target markets (including game enthusiasts, mass-market consumers, value buyers and children). In addition to its genre and market diversity, the firm publishes, develops and distributes products for a variety of game platforms and operating systems, including PCs, the Sony PlayStation One and PlayStation 2 and Nintendo N64 console systems and the Nintendo Game Boy handheld devices. The company is also currently focusing on the development of products for Microsoft Xbox and Nintendo GameCube console systems and Nintendo Game Boy Advance handheld device.



Activision is headquartered in Santa Monica and maintains operations in the U.S., Canada, the UK, France, Germany, Japan, Australia, and the Netherlands.



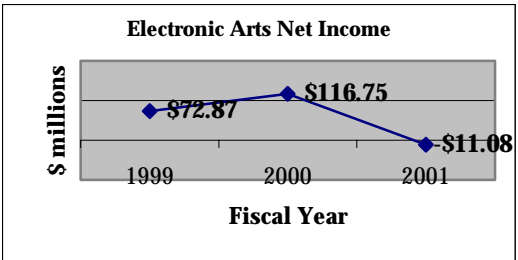
209 Redwood Shores Pkwy.
 Redwood City, CA 94065
 Tel: (650) 628-1500
 Fax: (650) 628-1414
www.ea.com
 CEO: Lawrence Probst, III

- World's leading independent interactive entertainment company
- One of the 50 public companies on Red Herring's 100 for 2001

Performance Measures	
Sales (ttm)	\$1.32B
Sales Growth (FYE 2000)	-6.88%
Profit Margin (ttm)	-0.7%
Net Income (FYE 2001)	-\$11.1M
Return-on-Assets (ttm)	-0.77%
Total Liabilities	\$340M
Debt-to-Equity (mrq)	0
Return-on-Equity (ttm)	-1.17%
Price-to-Earnings	N/A
Market Capitalization	\$7.57B
Stock Price (24 July 2001)	\$52.78
# of Employees	3,500

Source: Yahoo! Finance (ERTS)

Electronic Arts (ERTS), founded in 1982 and headquartered in Redwood City, CA, is the world's leading interactive entertainment software company. Electronic Arts (EA) develops, publishes and distributes software worldwide for the Internet, PCs and video game systems. The company markets its products under four brand names: EA Sports, EA Sports Big, EA Games and EA.com.



EA operates in two principal business segments globally: EA Core business segment comprises the creation, marketing and distribution of entertainment software, while the EA.com business segment is composed of the creation, marketing and distribution of entertainment software which can be played or sold online, ongoing management of subscriptions of online games and Website advertising.



417 Fifth Ave.
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Tel: (212) 726-6500
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www.infogrames.com

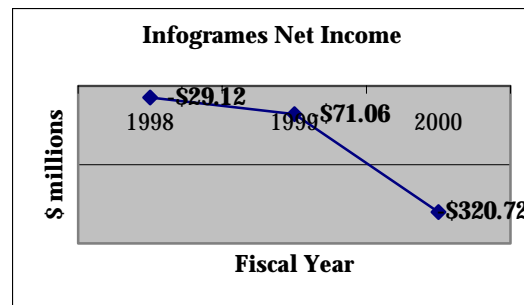
CEO: Bruno Bonnell

- Infogrames's Macintosh publishing label, MacSoft, is the #1 publisher of Mac entertainment software
- Award-winning franchises include Alone In The Dark, Driver, Deer Hunter, Test Drive, and Unreal

Performance Measures	
Sales (ttm)	\$270.8M
Sales Growth (FYE 2000)	-34.4%
Profit Margin (ttm)	-29.4%
Net Income (FYE 2000)	-\$320.7M
Return-on-Assets (ttm)	-48.66%
Total Liabilities	\$169.5M
Debt-to-Equity (mrq)	N/A
Return-on-Equity (ttm)	N/A
Price-to-Earnings	N/A
Market Capitalization	\$537.2M
Stock Price (24 July 2001)	\$7.75
# of Employees	651

Source: Yahoo! Finance (IFGM)

Infogrames, Inc. (IFGM) is a leading publisher and distributor of video games for consoles, PCs, and Macintosh systems. The company's publishing business consists of Children's, Leisure, and Frontline divisions. The Frontline and Children's Divisions publish premium-priced, higher production value titles for use on multiple platforms developed internally or through third party developers. The Leisure segment publishes value-priced PC titles for mass-market consumption.



Based in New York, Infogrames is a majority-owned subsidiary of France-based Infogrames Entertainment SA and serves as the headquarters for the company's operations in North America. Founded in 1983, IESA is a global publisher and distributor of video games for all platforms, as well as interactive digital television, mobile devices (WAP, HDML) and in-flight entertainment systems.

In 1999, the company took over GT Interactive, the publisher of Quake, Doom, Duke Nukem and other well-known games. GT Interactive operated a studio in Salt Lake City, but Infogrames has ceased operations in Utah as part of the company's worldwide restructuring.



575 Broadway
 New York, NY 10012
 Tel: (212) 334-6633
 Fax: (212) 941-3566
www.take2games.com
 CEO: Kelly Sumner

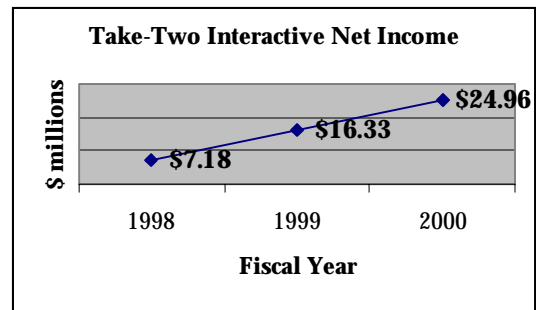
- Take-Two has grown rapidly, with net sales increasing from \$19.0 million for the fiscal year ended October 31, 1997 to \$387 million in 2000
- The company's Jack of All Games subsidiary is the number one domestic console game distributor with operations in nine countries

Headquartered in New York City, Take-Two Interactive Software, Inc. (TTWO) is an integrated global developer, marketer, distributor, and publisher of interactive entertainment software games and

accessories. The company's software operates on PCs and video game consoles manufactured by Sony, Nintendo, Microsoft, and Sega. Take-Two develops software internally and engages third parties to develop software on its behalf. The company publishes and develops products through various wholly owned subsidiaries including: Rockstar Games, Gathering of Developers, TalonSoft, Joytech, DMA Design, PopTop, Global Star and under the Take-Two brand name. Take-Two maintains sales and marketing offices in Cincinnati, New York, Toronto, London, Paris, Munich, Vienna, Copenhagen, Milan, Sydney and Auckland.

Performance Measures	
Sales (ttm)	\$418.6M
Sales Growth (FYE 2000)	26.5%
Profit Margin (ttm)	3.0%
Net Income (FYE 2000)	\$25.0M
Return-on-Assets (ttm)	3.75%
Total Liabilities	\$165M
Debt-to-Equity (mrq)	.46
Return-on-Equity (ttm)	6.76%
Price-to-Earnings	51.0
Market Capitalization	\$696.9M
Stock Price (24 July 2001)	\$19.10
# of Employees	658

Source: Yahoo! Finance (TTWO)





27001 Agoura Rd. Suite 325
 Calabasas Hills, CA 91301
 Tel: (818) 871-5000
 Fax: (818) 871-7586
www.thq.com

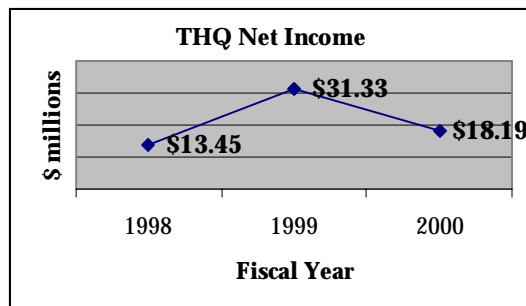
CEO: Brian Farrell

- Ranked as the number two independent software publisher and number four software publisher overall for the first five months of 2001
- U.S. console market share has increased the first half of 2001, up to 6.4 percent from 5.8 percent during the same period last year

THQ Inc. (THQI) is a developer, publisher and distributor of interactive entertainment software for hardware platforms in the home video game market. The company publishes titles for the PC, wireless devices, and those manufactured by Sony, Nintendo, and Microsoft in most interactive software genres, including children's, action, adventure, driving, fighting, puzzle, role playing, simulation, sports and strategy. THQ has released an aggregate of 253 titles as of December 31, 2000, consisting of 13 Nintendo titles, 82 Game Boy/Game Boy Color titles, seven Sega Game Gear titles, 14 Sega Genesis titles, 47 SNES titles, three Sega Saturn titles, 41 Sony PlayStation titles, 17 Nintendo 64 titles, four Sega Dreamcast titles, one Sony PlayStation 2 title and 24 PC titles. Its customers include Wal-Mart, Toys "R" Us, Electronics Boutique, Target, Kmart Stores, Babbages Etc., Best Buy, other national and regional retailers, discount store chains and specialty retailers.

Performance Measures	
Sales (ttm)	\$358.8M
Sales Growth (FYE 2000)	14.3%
Profit Margin (ttm)	7.6%
Net Income (FYE 2000)	\$18.2M
Return-on-Assets (ttm)	14.69%
Total Liabilities	\$97.8M
Debt-to-Equity (mrq)	0
Return-on-Equity (ttm)	22.02%
Price-to-Earnings	40.64
Market Capitalization	\$1.07B
Stock Price (23 July 2001)	\$47.77
# of Employees	410

Source: Yahoo! Finance (THQI)



DEVELOPERS/SMALLER PUBLISHERS

Building on Utah's current presence in game development, the state is in a position to grow the industry here by recruiting mainly developers and possibly one or two smaller, but established publishers. The companies subsequently profiled would add strength and stability to the industry in Utah and would encourage further growth and development in video games. All are leaders in their respective segments and have proven their capabilities through games developed in the past for multiple platforms. Each company is likely to fit with Utah's culture and current business environment.



An impressive line-up of world class development partners and popular game franchises enables Amaze Entertainment to maintain a strong-hold in the market and makes it a desirable company to attract to Utah.

12421 Willows Road NE #200
Kirkland, WA 98034
Tel: (425) 825-6800
Fax: (425) 825-6700
www.amazeent.com

CEO: Dan Elenbaas

- Developed hit games for strong franchises like Harry Potter, Barbie, Rugrats, and Hot Wheels
- Prominent partners, including Microsoft, Electronic Arts, and Mattel
- Founded in 1999

Amaze Entertainment is one of the largest developers of games and interactive entertainment. The company develops a variety of games for PCs, game consoles, and handheld game devices. Amaze Entertainment is comprised of three design studios that target specialized areas of game development.

Adrenium Games develops advanced level next generation games for complex platforms like Xbox, GameCube, and PlayStation 2. Griptonite Games develops blockbuster games for Game Boy Advance and Game Boy Color handheld gaming devices. The studio has developed games for popular franchises like Star Wars, Harry Potter, Ren and Stimpy, and Barbie. KnowWonder develops games and entertainment software for the PC. The studio partners with noted companies like Mattel, Hasbro, Electronic Arts, and Acclaim to create award winning games and educational software. KnowWonder's portfolio includes Rugrats in Paris, Magic School Bus, American Girl, and HotWheels Slot Car Racing.



A2M's charter to produce family-oriented, clean, and non-violent video games that everyone can enjoy makes it a good match for Utah's family focused culture and attractive industry prospect.

416 de Maisonneuve O.
 Suite 600
 Montréal, Québec
 Tel: (514) 843-4484
www.a2m.com
 President: Rémi Racine

Quick Facts	
Sales (2000)	N/A
Sales Growth	N/A
Credit Rating	N/A
# of Employees	96
Source: U.S. Business Directory	

- One of Canada's prominent video game developers
- Bugs Bunny Lost in Time, its second release, sold over 800,000 copies worldwide
- Released its first game in 1998

Formerly a subsidiary of Behavior Communications, Artificial Mind and Movement (A2M) develops family-oriented, non-violent video games for Sony PlayStation, Sega Dreamcast, Xbox, and Nintendo Game Boy platforms. The company designs action and adventure games based on original or licensed characters from third parties including games like The Grinch, Bugs & Taz: Time Busters, 3, 2, 1 Smurf, and Looney Tunes.

A2M also develops three-dimensional gaming software for the PlayStation One, PlayStation 2, Dreamcast, GameCube, Xbox, Game Boy Advance, and the PC. A2M's Jersey Devil was one of the first games developed that integrates total 3D technology. The company's video games are distributed by well-known game publishers Sony, Infogrames, Universal Interactive, and Konami. A2M currently has four new titles in production.



With over a decade of development experience, and several popular and award-winning games, ATD has an established position within the video game industry.

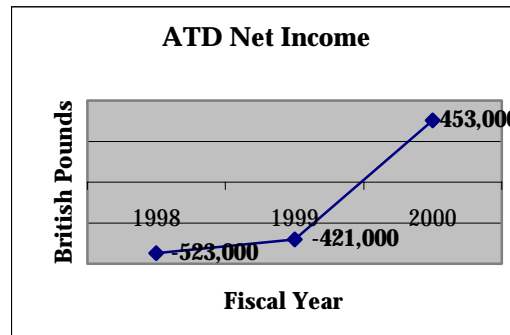
Unit 3, Nunhold Business Centre
 Dark Lane, Hatton, Warwickshire
 CV35 8XB, UK
 Tel: +44 (0) 1926 843444
 Fax: +44 (0) 1926 843363
www.atd.co.uk

 CEO: Nicholas Paul Seddon

Performance Measures	
Sales (FYE 2000)	£2.82M
Sales Growth (FYE 2000)	109%
Net Income (FYE 2000)	£453,000
Return-on-Assets (FYE 2000)	46.08%
Debt-to-Equity (FYE 2000)	.09
Return-on-Equity (FYE 2000)	N/A
# of Employees	75

Source: ICC Financial Analysis Reports

- ATD's award-winning game Sydney 2000 was the official video game of the Summer 2000 Olympic Games
- ATD's most popular game Rollcage ranks in the top five PlayStation hits
- Founded in 1988



Attention to Detail (ATD) has been in the video game design and development business for approximately 14 years. ATD creates games for the PC, Sony, PlayStation One and 2, and Microsoft's Xbox and is looking to expand into handheld devices. The company has released Rollcage, Rollcage Stage II, Sydney 2000, Ducati World, and LEGO LBE; and plans to release LEGO Racers 2 and Salt Lake City 2002, the official game for the Winter Olympics, in the near future.

ATD is best known for its futuristic racing game, Rollcage, published worldwide by Sony-Psygnosis for both the PlayStation console and the PC. ATD has developed games for many well-respected publishers including Psygnosis, Activision, LucasArts Games, Atari, Sega, Eidos, and most recently Acclaim. The company joined Kaboom Studios Group, originally GBH Group, the largest development group in the UK, in March 1997.



Ranked 11th on Profit's list of Canada's 100Fastest Growing Companies, BioWare's impressive growth and industry accolades make it one of the video game industry's top companies, and one that Utah should recruit in further building its base in video games.

302 10508 82 Ave.
Edmonton, Alberta
Canada T6E 6H2
Tel: (780) 430-0164
Fax: (780) 439-6374
www.bioware.com

Joint CEOs: Ray Muzyka and
Greg Zeschuk

Quick Facts	
Sales (2000)	\$20-50M
Sales Growth	N/A
Credit Rating	N/A
# of Employees	95
Source: Canada Business Directory	

- Eleventh-fastest growing company in Canada last year
- BioWare's role-playing game Neverwinter Nights was recently awarded "Best Role-playing Game of E3 2001," one of the industry's most prestigious awards
- Founded in 1995

BioWare Corp. is an electronic entertainment company that produces interactive computer games, console games, and video entertainment. BioWare is well known within the video game industry, winning numerous awards for its role-playing games. The company's Neverwinter Nights recently was named "Best of Electronic Entertainment Expo's (E3) - Overall" by Game-Revolution magazine. The game also received three nominations by the Expo's governing body for "Best PC Game," "Best Online Game," and "Best Roleplaying Game," and was awarded "Best Roleplaying Game." One of BioWare's first games, Baldur's Gate, was named "Game of the Year" by Computer Games Online, Computer Games Strategy Plus, GameCenter Reader's Choice, GamesDomain, Imagine Games Network, and Vault Network.

BioWare partnered with LucasArts Entertainment Company to create the first Star Wars role-playing video game, Star Wars: Knights of the Old Republic, scheduled to be released in late 2002. BioWare's growth and recognition has earned it a spot on the Profit 100 list of Canada's Fastest-Growing Companies and made it the second fastest growing business in the province of Alberta.



Climax is well respected within the industry both in the UK and worldwide, and has grown substantially over the last decade in part through acquisitions. Developing for all major consoles and for emerging technologies, the company is poised to capitalize on the new technologies in the industry with both licensed and original material.

Fareham Heights
Standard Way
Fareham, Hampshire
PO16 8XT, UK
Tel: 44 (0) 1329 827777
Fax: 44 (0) 1329 828777
www.climax.co.uk

CEO: Karl Jeffery

Quick Facts	
Sales (FYE 2000)	N/A
Sales Growth (FYE 2000)	N/A
Debt-to-Equity (FYE 1999)	1.42
# of Employees	225
Source: ICC Financial Analysis Reports	

- One of only two UK developers selected by Microsoft to develop Xbox games
- Developed over 150 video games
- Founded in 1988

Climax is a multi-format video game developer offering a wide range of services to publishers. The company is composed of approximately 10 project teams that develop gaming solutions for major video game platforms including the Xbox, PlayStation One, PlayStation 2, Dreamcast, Nintendo 64, GameCube, Game Boy, and Game Boy Advance. The company has recently entered several new market segments including online games, PDA & cellular 'phone games and web (JAVA) games.

Climax Group's three major studios in the UK have developed over 150 hit games for publishers including Electronic Arts, 3DO, Midway, Sega, Konami, and Acclaim. The company has produced both original and licensed titles. Recent games include Theme Park World (PlayStation), BattleZone: Rise Of The Black Dogs (Nintendo 64), Populous: The Beginning (PlayStation), SuperBikes 2000 (PlayStation) and Stunt Driver (PlayStation 2). Climax has close relationships with all game console manufacturers.



Despite the company's negative growth in 2000 due to flux in the industry, Codemasters has become an established and respected publisher through its policy of steady, controlled growth. In July, Codemasters reached its 100th week at the top of the UK's best-sellers lists and has had 60 games reach #1 since inception.

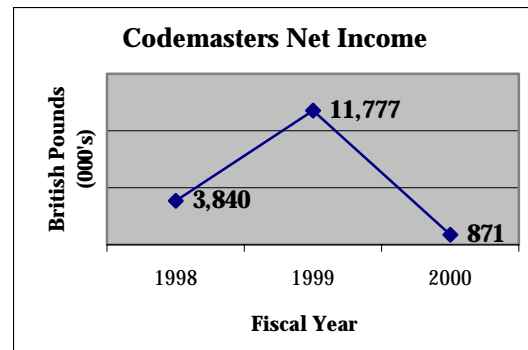
PO Box 6,
Leamington Spa,
Warwickshire,
CV47 2DL, UK
Tel: 44 (0) 1926 814132
Fax: 44 (0) 1926 817595
www.codemasters.com

Joint CEOs: David and Jim Darling

- Named "Publisher of the Year" for 1998 by Edge Magazine
- Its Colin McRae title reached the top-selling position in over 26 markets worldwide
- Founder and CEO David Darling was named UK's "Entrepreneur of the Year" for 2000

Performance Measures	
Sales (FYE 2000)	£36.4M
Sales Growth (FYE 2000)	-37.1%
Net Income (FYE 2000)	£871,000
Return-on-Assets (FYE 2000)	1.74%
Debt-to-Equity (FYE 2000)	.79
Return-on-Equity (FYE 2000)	11.0%
# of Employees	450+

Source: ICC Financial Analysis Reports



Founded in 1986, UK-based Codemasters has become one of Europe's best-selling and profitable game makers, developing and publishing titles for console platforms as well as PCs. Hit games include Micro Machines, Colin McRae Rally, TOCA Touring Cars, and Brian Lara Cricket. Codemasters has also introduced FADE, a unique PC-based piracy protection system that can degrade gameplay if a counterfeit copy of the game is identified as being played.

Codemasters has European satellite operations in France, Germany, Spain, and Scandinavia, and U.S. headquarters in New York. Currently, the company is extending its business model into the U.S. Initially, sales and distribution operations have been set up in Southern California by way of an arrangement with Activision. The company also maintains an online gaming development facility in Oakhurst, CA.



Crave Entertainment’s strong distribution channel and impressive licensing line-up with some of the most popular franchises in the world give the company a strong industry presence and make it an attractive candidate for Utah’s rapidly developing video game sector.

19645 South Rancho Way
Dominguez, CA 90810
Tel: (310) 687-5400
www.cravegames.com

CEO: Nima Taghavi

Quick Facts	
Sales (2000)	N/A
Sales Growth	N/A
Credit Rating	N/A
# of Employees	35
Source: Crave Entertainment web site	

- Crave’s subsidiary, SVG Distribution, is one of the largest distributors of video games, distributing to over 20,000 retail outlets in North America
- Crave’s Ultimate Fighting Championship franchise was awarded “E3 2000 Game Critics’ Best Fighting Game” twice
- Founded in 1997

Headquartered in Los Angeles, Crave Entertainment is a privately held worldwide publisher, developer, and distributor, with offices in San Francisco and Seattle. The company is a licensed third party developer and publisher for Sony, Nintendo, Sega, and Microsoft, as well as PC platforms. Crave has the experience and resources to move a game from concept to launch, including product development, global sales and marketing, and investment capital.

Crave has worked with a number of development studios on a number of notable releases including Quake and Duke Nukem for Saturn, Final Fantasy II and III, Battlezone, Command & Conquer, Asteroids, Warcraft, Diablo, and Gex. Crave has licensing agreements with popular franchises Men in Black, Godzilla, Ultimate Fighting Champion, and Tony Hawk’s Pro Skater. Crave recently entered into a worldwide publishing agreement with Irrational Games, know for its role playing and strategy releases. Crave’s subsidiary, SVG Distribution, distributes to over 20,000 retail outlets including Wal-Mart, Toys ‘R Us, Electronics Boutique, and Best Buy.



Kuju Entertainment has established a significant foothold in the simulation games segment with popular titles such as Flight Semi Toolkit, Microsoft Train Simulator, Eagle One, Tank Racer, and Lotus Challenge.

Unit 10 Woodside Park Catteshall Lane Godalming, Surrey GU7 1LG, UK Tel: +44 (0) 1483 414344 Fax: +44 (0) 1483 414287 www.kuju.com Managing Director: Jonathan Newth	Quick Facts	
	Sales (2000)	\$2.5M
	Sales Growth	N/A
	Credit Rating	N/A
	# of Employees	60+
	Source: ICC Financial Analysis Reports	

- Formed partnerships with noted publishers Microsoft, Freeloader, and Vie
- Popular release Terracide is widely known for its award winning special effects
- Formerly specialized in simulation software for commercial training
- Founded in 1998

Kuju Entertainment has been in the business of developing games for over 11 years. The company develops titles for both PC and game consoles. Staying at the forefront of cutting-edge video game technology, Kuju was an early adopter of DirectX and 3D accelerators for PC game development. In the console sector, Kuju has partnered with heavyweights Sony and Microsoft for development of PlayStation 2 technology and Xbox specific code.

Kuju and its subsidiaries have released a variety of games including Eagle One for PlayStation; Missing in Action for PlayStation 2; as well as Tank Racer, Team Apache, Xenocracy, Terracide, KA-52 Team Alligator, Peacemaker and the very popular Flight Sim Toolkit for the PC. Terracide won an award for its special effects. Additionally, Kuju is in the process of developing and releasing Microsoft Train Simulator, Lotus Challenge, and Halcyon Sun.



Mythic Entertainment has strategically established a number of industry partnerships and obtained contract wins with prominent entities in the entertainment industry, evolving into an important player in the online gaming segment of the video game industry.

3919 Old Lee Highway
 Suite 82A
 Fairfax, VA 22030
 Tel: (703) 934-0449
www.mythicentertainment.com
 President: Mark Jacobs

Quick Facts	
Sales (2000)	N/A
Sales Growth	N/A
Credit Rating	N/A
# of Employees	70
Source: Mythic Entertainment web site	

- Mythic Entertainment has developed 11 online games for prominent entities like AOL and ENGAGE Games Online
- Mythic Entertainment recently received an equity investment from entertainment company Abandon Entertainment
- Founded in 1995

Mythic Entertainment is a developer of multi-player games for online gaming. To date, the company has developed 11 online games for prominent pay-for-play publishing and distribution entities like AOL, the Centropolis Gaming Center, Gamestorm, and ENGAGE Games Online. Games developed by Mythic Entertainment range from action/adventure games to roleplaying and strategy games and include popular titles like Independence Day Online, Dark Age Camelot, Dragons' Gate, Starship Troopers, Godzilla Online, and Aliens Online.

To further leverage its growth, Mythic Entertainment has established a number of corporate partnerships and alliances. Prominent among these is an online gaming development partnership with and an equity investment from Abandon Entertainment. Other partners include Centropolis Interactive, Iron Crown Enterprises, Kesami Corporation, and Eleven:Eleven Productions.



Z-Axis is a premier developer of interactive sports entertainment software, developing a number of best-selling titles for publishing giants in the video game industry. Z-Axis' industry reputation and successful track record positions it for continued growth and success.

21021 Cosair Blvd.
 Suite 200
 Hayward, CA 94545
 Tel: (510) 887-7900
 Fax: (510) 887-7912
www.z-axis.com
 CEO: David Luntz

Quick Facts	
Sales (2000)	\$1-2.5M
Major Investors	N/A
Credit Rating	Satisfactory
# of Employees	N/A
Source: U.S. Business Directory	

- Prominent publishing partners include Acclaim Entertainment, Activision, and Electronic Arts
- Developed blockbuster titles John Madden Football '96, Thrasher: Skate and Destroy, and FOX College Sports Hoops '99
- Founded in 1994

Z-Axis develops interactive entertainment software for the PC and a variety of video game consuls, focusing on sports game development. The company has worked closely with top-tier video game developers like Acclaim Entertainment, Activision, Rockstar Games, Fox Interactive, and Electronic Arts to develop a number of best selling titles.

Popular titles include John Madden NFL Football '96 for Sega Genesis; Thrasher: Skate and Destroy for PlayStation; FOX Sports College Hoops '99 for Nintendo 64; remake of classic Space Invaders for PlayStation, Nintendo 64, and the PC; Dave Mirra Freestyle BMX for PlayStation, Sega Dreamcast, and Game Boy Color; and Freestyle Motocross: McGrath vs. Pastrana for PlayStation.

DIRECT MODEL

As discussed in the Value Chain section of this report, the Internet is providing new ways for game development companies to do business. One of the most promising changes is selling games directly to the consumer via digital commerce. Despite the three major obstacles of digitally distributing games mentioned in the Value Chain section of this report, no one is ignoring its possibilities and some have begun using this model.

Companies such as Activision (www.activision.com) have already taken the first steps by cutting the retailers out of the value chain. All of Activision's published titles are available to be purchased and shipped directly from Activision, effectively cutting the retailer from the value chain. Although this is a step in the right direction, Activision is not utilizing the full potential of the Internet. Most of the companies selling directly to customers are currently using the web as little more than a storefront to collect orders. While this the best that can be done for cartridge-based game systems, the real power of this emerging business model is yet to be seen.

Activision may not be using the full potential of the Internet, but some companies are. RealArcade (www.realarcade.com), an online video game company, delivers games to consumers directly over the web. RealArcade, a service provided by Real.com (makers of RealPlayer) is a special browser/game interface that can be downloaded for free. Once the browser is downloaded, consumers can connect to the Internet and download demo games for free. If the consumer likes the game he or she can then purchase it directly over the web and have access to all game features. There is no waiting for a package in the mail, and no need to pick things up somewhere. This is the first major step taken by any major commercial organization has taken towards digital distribution.

Because RealArcade has decided to venture into digital distribution despite such limitations as copy protection, slow changing consumer habits, and limited use of broadband, the company is facilitating the growth of an industry segment that many considered dead. Even though new technology is driving up the R&D costs and size of video games, small mom-and-pop shops publishing simple game titles have found an audience through RealArcade. Rene-Gilles Deberdt (www.kyodai.com) is a one-man operation successfully selling his games through RealArcade. Although, according to the RealArcade top ten lists, Rene-Gilles Deberdt's Mahjongg game has consistently been in the bottom five for most frequently downloaded, it has consistently been in the top three for most frequently purchased.

Although this segment is relatively small compared with the rest to the video game industry, it does have potential to push the industry into greater use of digital sales, giving any of the companies involved in RealArcade the opportunity to become major players.

The three companies listed below are companies that are currently finding success with RealArcade, and that could become major players. If attracted to the state and helped to grow, their economic impact could be great.



With an online business model that has already proven profitable and several leading games on the market, PopCap Games is an up-and-coming video game developer well positioned to be a leader in the online game development sector.

31900 104 Ave. SE
 Auburn, WA 98092
 Tel: (253) 288-0844

www.popcap.com

 Director of Business
 Development: John Vehey

Quick Facts	
Sales (2000)	N/A
Sales Growth	N/A
Credit Rating	N/A
# of Employees	5
Source: Pop Games' web site	

- Ranked #1 on RealArcade's list of top selling publishers
- PopCap's Tetris-like Diamond Mine is the #1 game on MSN's GameZone (where its called Bejeweled), as well as Zone.com
- Founded in 2000

PopCap Games, a small video game development company based in Seattle, is well known for developing some of the most popular gaming applications for PDAs and the Internet aimed at the general consumer audience. Focusing on puzzle games, PopCap's games are 100 percent java and are compatible with most browsers and connection types. Popular PopCap games include:

- Alchemy
- Atomica
- Bejeweled/Diamond Mine
- Mummy Maze
- Phychobabble!
- Seven Sea's

Bejeweled and Alchemy currently account for 20 percent of daily traffic on Microsoft 's Gaming Zone site.

While it employs an online business model, PopCap is already profitable and generates revenue in two ways:

1. Online advertising commission, and
2. Licensing fees other companies pay PopCap to use its games on their sites.



With over 15 online games by the end of 2001 and a number of distribution partnerships with well known publishers like Real Networks, Global Star Software, and Gameplay, Small Rockets is poised for future growth and success.

The Old Magistrates Court
 71 North Street
 Guildford, Surrey
 GU1 4AW
 Tel: (0) 1483 445440
 Fax: (0) 1483 445444
www.smallrockets.com
 Managing Director: Jonathan Small

Quick Facts	
Sales (2000)	N/A
Sales Growth	N/A
Credit Rating	N/A
# of Employees	30
Source: Small Rockets web site	

- With 11 original downloadable PC titles currently, Small Rockets will have over 15 games by the end of 2001
- Multiple partners, including Real Networks, Global Star Software, and Gameplay
- Founded in 2000

Small Rockets is an independent video game development company based in Guildford, UK, with a mission of exploiting new interactive entertainment opportunities enabled by the convergence of digitally connected computing devices. The company's team of approximately 30 employees has aggregated experience of 15 years in the video game industry.

Small Rockets specializes in producing high quality game titles for the PC, which are distributed and purchased entirely online via the Small Rockets website and other content partners such as Real.com Games. The company also creates games for a variety of other platforms such as set-top boxes, web browsers, and mobile phones.

Successful games published by Small Rockets include Master Of The Skies, Tower Of the Ancients, and MAD for the PC, and Air Hockey, Concentration, and Battleships for browsers, phones and set-top boxes.



With over 20 years of experience in game development and publishing, a seasoned team of top game designers, a suite of award winning games, and a world renowned parent company, Vivendi Universal Publishing, Sierra, Inc. is an established leader in the video game industry.

3060 139th Ave. SE, Suite 500
Bellevue, WA 98005
Tel: (425) 649-9800
www.sierra.com

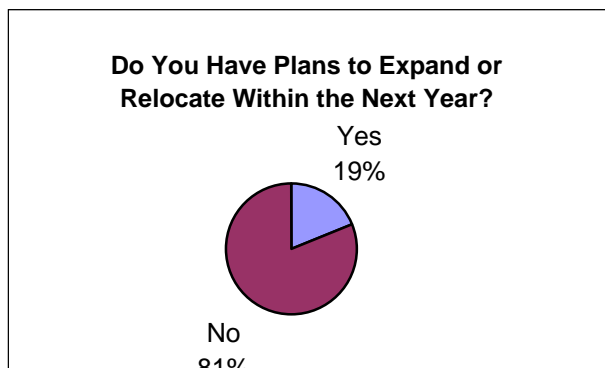
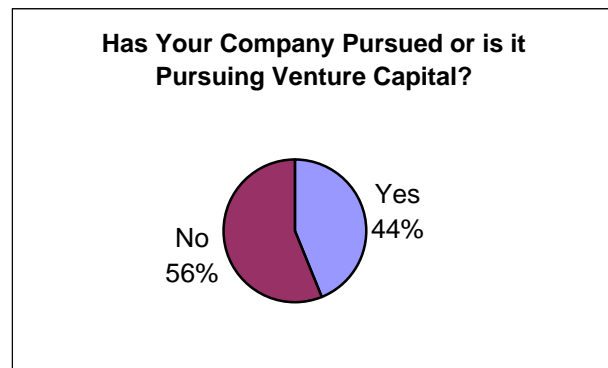
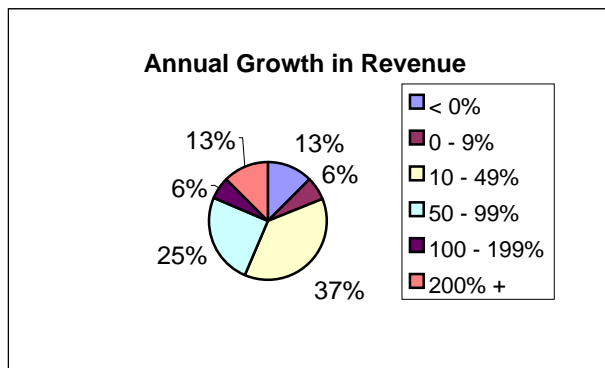
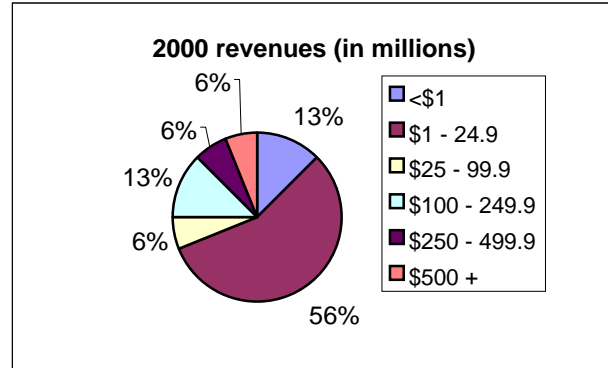
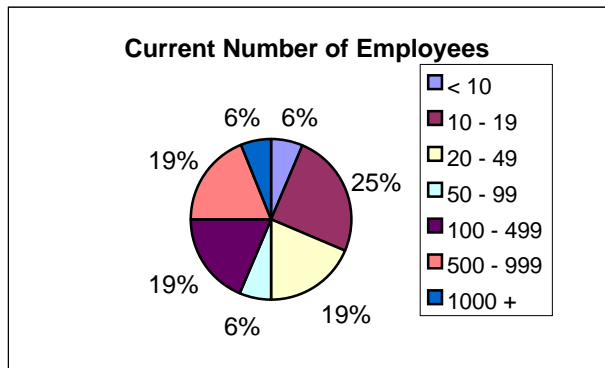
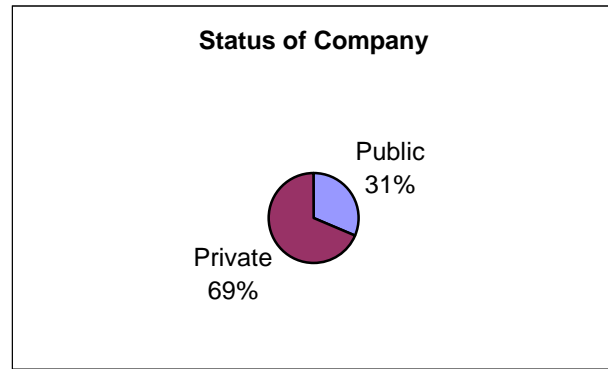
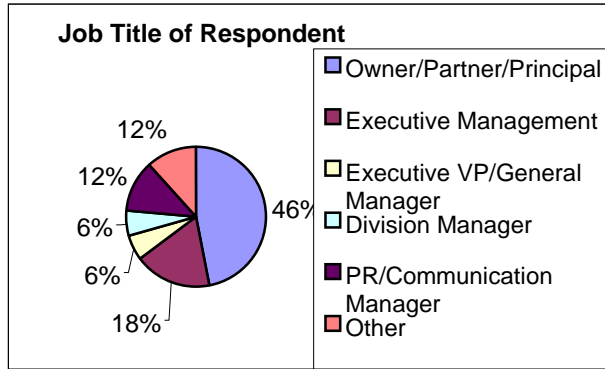
CEO: Thomas K. Hernquist

- Leading developer and one of the largest worldwide publishers of interactive entertainment software
- Produced a number of award winning video games including King's Quest
- Founded in 1980

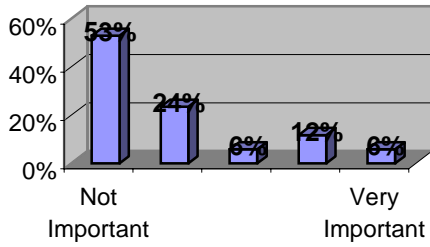
Sierra, Inc. is one of the original developers and publishers of interactive entertainment and productivity software for PCs. Owned by leading publishing conglomerate Vivendi Universal, Sierra is part of Vivendi Universal's Games division. Sierra is renowned for releasing critically acclaimed and award winning titles that represent a wide variety of computer entertainment for both console and PC platforms.

With a team of renowned game designers including co-founders Roberta Williams, David Lester, and David Kaemmer, Sierra has been a recognized innovator in the computer software field for almost 20 years. Sierra is composed of three development divisions; Sierra Attractions, producing classic games like Hoyle and You Don't Know Jack for the largest segment of PC gaming, the casual user; Sierra Sports, developing sports entertainment software games like Nascar Racing 3 and Golf Pro 99; and Sierra Studios, well known for producing high-end creative games like awarding winning King's Quest and Mask Eternity. Sierra plans to release 11 additional PC and next generation console games this year including Die Hard: Nakatomi Plaza, Empire Earth, Throne of Darkness, and Jonny Drama, exclusively for Microsoft's Xbox.

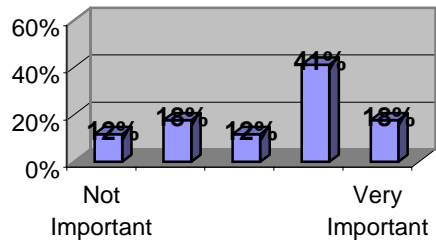
APPENDIX 1: VIDEO GAME SURVEY RESULTS



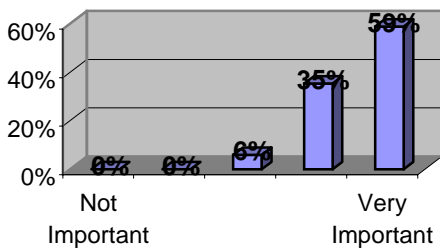
Locally Available Customers and Suppliers



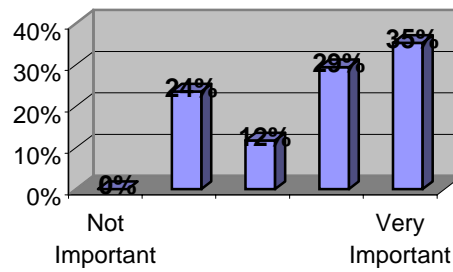
Locally Available Research Institutions and Universities



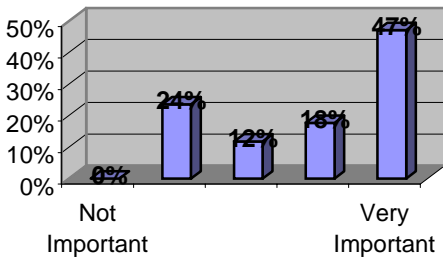
Locally Available, Highly-skilled Labor Force



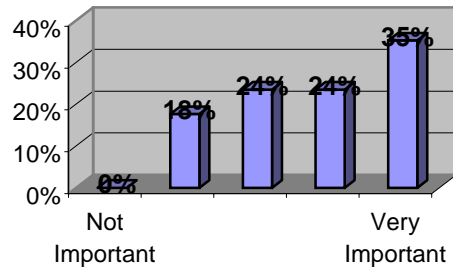
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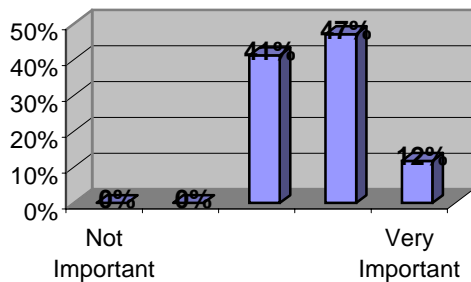
State Business Incentives



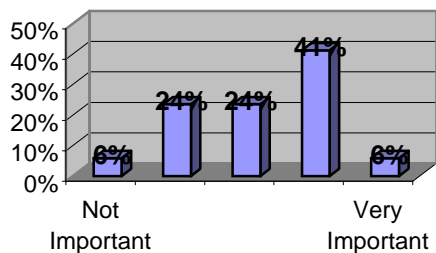
State Taxes



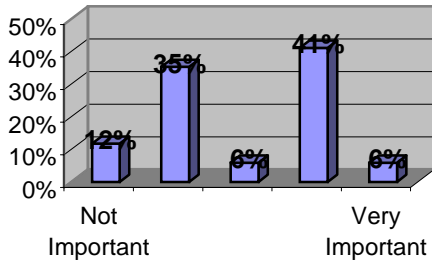
Geographic Location



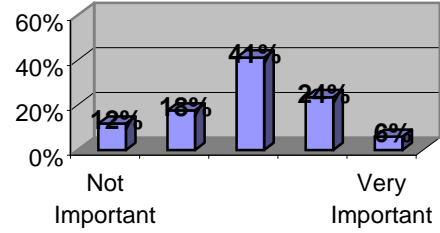
Locally Available Professional Resources



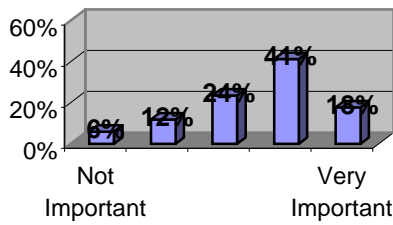
Locally Available Capital Resources



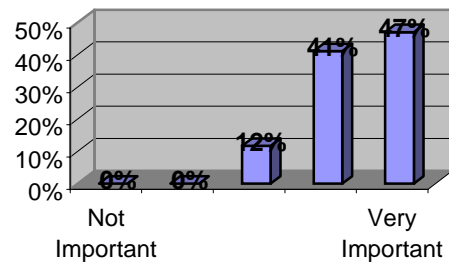
Quality of Local Transportation Infrastructure



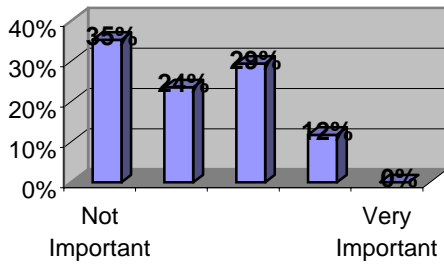
Close Proximity to a Major Urban Center



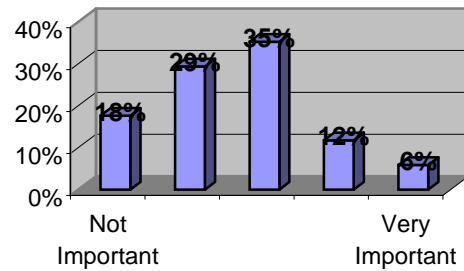
Quality of Life



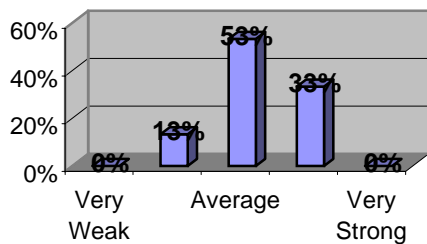
Close Proximity to Competitors



Close Proximity to Leading Firms



Rating of Utah's Overall Technology Business Environment

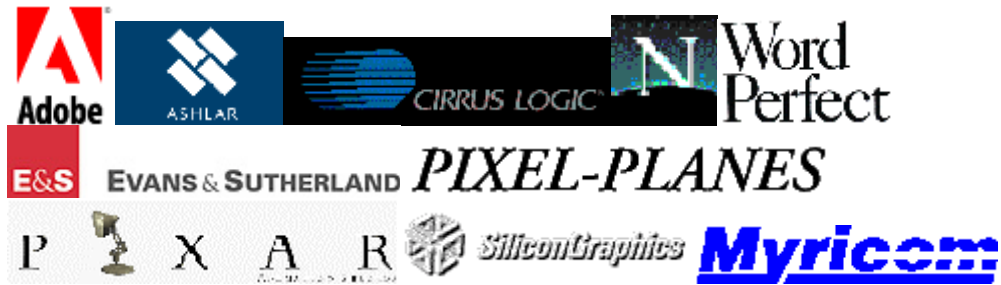


APPENDIX 2: HISTORY OF THE U OF U SCHOOL OF COMPUTING¹¹⁹

“Almost every influential person in the modern computer-graphics community either passed through the University of Utah or came into contact with it in some way.”¹²⁰

The School of Computing (the Computer Science Department until 2000) at the University of Utah has a long history of distinguished faculty and alumni who have made substantial contributions to research and industry. Following is a brief overview of some of the most well known people and their work.

COMPANIES FOUNDED BY UTAH FACULTY AND ALUMNI



MAJOR CONTRIBUTIONS BY UTAH FACULTY AND ALUMNI

- Developed the oldest algebraic mathematics package (REDUCE) still in use
- First interactive graphics program, Sketchpad
- First method for representing surface textures in graphical images
- Gouraud smooth shading model for computer graphics
- Invention of magnetic ink printing technology
- The Johnson counter logic circuit
- Phong lighting model for shading with highlights
- Pioneering work in asynchronous circuits
- Pioneering work in computer animation
- Pioneering work in computer art
- Pioneering work in digital music recording
- Pioneering work in graphical user interfaces
- Pioneering work in stack machine architectures

Time Line: Distinguished Utah faculty and alumni¹²¹

David Evans, Computer Science Faculty 1965-1980

- Founded the computer science department and was its first chairman from 1965-1973
- Co-founder of Evans & Sutherland

Ivan Sutherland, Computer Science Faculty 1968-1974



- *1998 IEEE Medal*: John von Neumann Medal “for pioneering contributions to computer graphics and microelectronic design and leadership in the support of computer science and engineering research”; *ACM Turing Award* (1988) for numerous contributions to computer graphics; First recipient of the ACM SIGGRAPH Coons Award for contributions to computer graphics.
- Co-founder of Evans & Sutherland

Robert Barton, Computer Science Faculty 1968-1973

- Invented the first stack machine architecture.
- Principal architect of all Burroughs computers.
- Co-inventor of dataflow.

Tom Stockham, Computer Science Faculty 1969-1981

- Created the field of digital recording; *1998 IEEE Medal*: Jack S. Kilby Signal Processing Medal “for pioneering the field of digital audio processing.”
- Founder of *Soundstream Inc.*, which pioneered digital music recording and editing that led to the large-scale production of compact discs and CD players.

Alan Kay, Ph.D. 1969

- Developed the notion of a graphical user interface at Xerox PARC, which led to the design of Apple Macintosh computers; Developed Smalltalk.
 - Fellow at Apple Computer
-

John Warnock, Ph.D. 1969

- Worked on the Illiac 4 Project, a NASA space flight simulator, and airplane simulators at Evans & Sutherland
- Developed the Warnock recursive subdivision algorithm for hidden surface elimination; Founder of *Adobe Systems*, which developed the Postscript language for desktop publishing.



Chuck Seitz, Computer Science Faculty 1970-1973

- Pioneer in asynchronous circuits; Co-designer of the first graphics machine, LDS-1 (Line Drawing System); Designed the Cosmic Cube machine as a research prototype that led to the design of the Intel iPSC.
- Founder of *Myricom*



Ronald Resch, Computer Science Faculty 1970-1979

- Pioneer in the field of computer art.

Alan Ashton, Ph.D. 1970

- Founder of *WordPerfect*



Tony Hearn, Computer Science Faculty 1971-1981

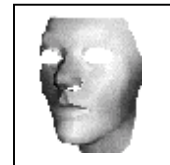
- Second department chairman, 1973-1981.
- Developed the oldest algebraic mathematics package (REDUCE) still in active use.

Duane Call, Ph.D. 1971

- Founder of *Computer Systems Architects (CSA)*
- Designer of FPS-120 supercomputer, specializing in vector calculations

Henri Gouraud, Ph.D. 1971

- Developed the Gouraud shading method for polygon smoothing - a simple rendering method that dramatically improved the appearance of objects.



Elliott Organick, Computer Science Faculty 1973-1985

- Founder of SIGSCE (ACM Special Interest Group on Computer Science Education); Won *Outstanding Contributions to Computer Science Education* award from SIGSCE in March 1985.
- Author of several widely used computer science textbooks, including *A FORTRAN Primer* (later revised as *FORTRAN IV*), *Computer Science: A First Course*, and *Programming Language Structures*

Ed Catmull, Ph.D. 1974



- Pioneer in computer animation; Developed the first computer animation course in the world.
- Co-founder of *Pixar Animation Studios*, a leading computer graphics company which has done work for LucasFilm and was recently involved in the production of the movie *Toy Story*.

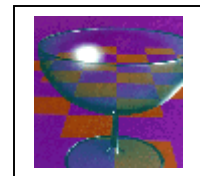
Jim Clark, Ph.D. 1974



- Rebuilt the head-mounted display and 3-D wand to see and interact with 3-dimensional graphic spaces.
- Founder of *Silicon Graphics Inc.*; Founder of *Netscape Communications Corporation*
Founder of *Healtheon/WebMD*

Bui Tuong-Phong, Ph.D. 1975

- Invented the Phong shading method for capturing highlights in graphical images by modeling specular reflection. Phong's lighting model is still one of the most widely used methods for illumination in computer graphics.



Henry Fuchs, Ph.D. 1975

PIXEL-PLANES

- Research in high-performance graphics hardware; 3D medical imaging; head-mounted display and virtual environments.
 - Founder of *Pixel Planes*
-

Martin Newell, Ph.D. 1975, Computer Science Faculty 1977-1979

- Developed procedural modeling for object rendering; Co-developed the Painter's algorithm for surface rendering
- Founder of *Ashlar, Inc.*, which develops computer-assisted design software.



Frank Crow, Ph.D. 1975

- Developed anti-aliasing methods for edge smoothing

Martin Griss, Computer Science Faculty 1977-1983

- Developed Portable Standard LISP (PSL).

Suhas Patil, Computer Science Faculty 1977-1981

- Founder of *CIRRUS Logic* (originally known as Patil Systems)
- Developed the first Petri Net-based circuit synthesis system for asynchronous circuit design.



James Blinn, Ph.D. 1978

- Invented the first method for representing surface textures in graphical images.
- Produced a PBS series called *The Mechanical Universe*, which used animation to teach the basic principles of physics and mathematics; Collaborates with Tom Apostole on *Project Mathematics!*, an educational video series about mathematics.



Jim Kajiya, Ph.D. 1979

- Developed the frame buffer concept for storing and displaying single-raster images.

Robert Johnson, Computer Science Faculty 1987-1993

- Invented the magnetic ink printing technology used on virtually every check we write.
 - Invented the Johnson counter logic circuit.
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