

THE DIFFUSION PROCESS OF THE NINTENDO ENTERTAINMENT SYSTEM IN THE UNITED STATES: 1985-1990

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I. INTRODUCTION

The purpose of our research is to analyze the diffusion process of the Nintendo Entertainment System (NES) game units in the United States. The NES, manufactured and marketed by Nintendo Company Limited has achieved a phenomenal rate of diffusion in the United States. The popularity of its game, Super Mario Brothers, exceeds that of Mickey Mouse among children. The NES is a home video entertainment unit which can easily be connected to a television set. It includes a compact control deck, user controllers and software cartridges.

Our main research question is: Why has the NES diffused so rapidly in the United States ? First, we will review the history of home video games. Second, we will analyze the marketing strategy of

Nintendo. Third, we will explain the role of NES techonological innovation in relationship to its diffusion. Fourth, we will determine the consequences of NES diffusion. Finally, on the basis of our analysis of NES's phenomenal rate of diffusion, we will suggest strategies that would help further NES diffusion.

In order to trace the diffusion process of the NES, we conducted individual interviews with the NES adopters in different age groups. First, interviews were conducted in front of the arcade video games at the Student Union, University of Southern California, on November 9, 1990 (Friday afternoon) with young adults, aged 21-30. A second set of interviews was conducted in front of World of Nintendo, a company-owned retail outlet, at Fox Hills Shopping Mall, Culver City, on November 11, 1990 (Monday afternoon) with kids, aged 11-14. In addition, we interviewed with Thomas G. Sarris, in charge of Nintendo public relations, Hill and Knowlton Inc., Los Angeles, on November 28, 1990.

The diffusion study of the NES leads us to discuss the information society. The NES is amassing enormous power. No computer system other than the NES has diffused to approximately 30 percent of U.S. households. This research is thus very valuable: The NES has the potential to give "full play" to the achievement of the computer-based society.

II. BACKGROUND AND HISTORY OF HOME VIDEO GAMES

1. The Origin of Home Video Games

A video game is an entertainment system which uses computer

and television technology in order to create a game for amusement. A home video game is a video game which is equipped and used mainly in a family. The origin of an amusement game can be seen before World War II in the U.S. at amusement shops, where amusement machines, called coin-operated games or arcade games, were implemented.

After World War II, television sets diffused in the U.S. widely. In addition, an electronic computer was invented in 1946 in Pennsylvania University. Soon after the invention of a computer, many studies were performed in order to research the application of this computer to various fields. Among them, in 1962, students at MIT (Massachusetts Institute of Technology) developed and demonstrated "Spacewar," which is the original of videogames, using a computer and a CRT (Cathode Ray Tube). This game was copied and spread throughout U.S. universities. As a consequence, Spacewar profoundly influenced students who had interests in computer science.

Nolan Bushnell was one such student. After graduating from the University of Utah, he went to work as an engineer, and eventually he became aware that the rapid progress of integrated circuits around 1970 would make the enhanced video game within reach of engineers. Emulating a ping-pong game, he developed a video game called Pong in 1972. Pong gained startling popularity as soon as it appeared in arcade shops.

Industry insiders saw that the functioning of Pong was similar to the video hockey game which used a television. The hockey game was developed by Baer in 1967 prior to Bushnell's work, but it was not exhibited in public. In any case, Bushnell and his companies would be credited with expanding the video game: as Bloom (1982, p. 9) put it,

“Ralph Baer was the first to engineer games on a raster, and Nolan Bushnell, converting technologies, capitalized on it.”

Stimulated by the success of Pong, many companies rushed to enter the video game industry, and several significant inventions were created, in particular, such as vector displays. Until then, raster displays were commonly used for video games. In raster displays, the line must be indicated by a set of a dot, which were standard television display devices. By the invention of vector displays, the line could become indicated by designating the starting and ending points. As a result, many more moving objectives can be drawn simultaneously.

Moreover, the programmable video game machine was developed and appeared in 1976. This development, which was a typical application of information technology, made possible the use of a machine for various games, so that the flexibility of a video game was enhanced greatly. Video game software became packaged in a cartridge so as to change one game with another easily.

What is equally more, if not, important is the development of the portable video game machine at inexpensive prices. Again owing to the rapid progress of the information technology, the video game machine, which has sufficient functions to entertain players, became small and inexpensive enough to possess even in the home. Popular home video machine in the early 1980s were CX-2600 (Atari), ColecoVision (Coleco), Intellivision (Mattel), Odyssey 2 (Magnavox) and so on. The most popular one among them was Atari CX-2600 and its price was \$159.95.

Many kinds of attractive software were developed as the technology relating to video games advanced. Some games were also im-

ported. For instance, "Space Invaders" and "Pac-Man" are the most famous blockbusters imported from Japan in the 1970s and early 1980s.

2. Astonishing Growth around 1980

Through these years, Atari continued to be a leading company in the video game industry. Atari was established by Bushnell in 1972. Bushnell always had a "we're all brothers" attitude. However, because of the expansion of the business and the intensifying competition, Atari introduced capital from Warner Communications in 1976. Soon after, Bushnell retired, and "the entrepreneurial craziness and the fun that went with it were gone. Three-piece suits replaced the jeans and T-shirts around Atari" (Rogers, 1984, p. 262).

Atari continued developing its business, in spite of the dismissal of Bushnell. In 1981, the revenue of Atari (Warner) in the home video game division was estimated to be \$710 million, and Atari captured 64.5 percent of overall sales in the home video game industry (The Home Video & Cable Yearbook, 1982-1983, p. 159).

The video game industry in the U.S. displayed a remarkable growth rate during the period from 1979 to 1982. As shown in Exhibit 1, the U.S. apparent consumption of video games rose from \$215 million in 1979 to \$3.7 billion in 1982 (Watkins, 1984, p. 46). It can be said that the ability to create an attractive video game for consumers is a critical success factor in the video game industry, and Watkins (1984, pp. 42-49) points out that the competitiveness of the U.S. video game industry is strong in terms of this critical success factor (1984, p. 49). However, he did not forget to mention that the the U.S. consumption of video games peaked in 1982, and that this downturn can be explained by following factors:

EXHIBIT 1

Video Games: Apparent U. S. Consumption, by Types, 1978-1982
(Quality in thousands of units)

Period	Coin-operated video games	Video game systems	Home computers	Game software	Hand-held video games
1978	24	1522		★	★
1979	★	1190	★	★	8971
1980	158	2117	★	9557	11207
1981	355	6202	130	33981	4107
1982	439	10356	653	79589	6583

Video Games: Apparent U. S. Consumption, by Types, 1978-1982
(Value in thousands of dollars)

Period	Coin-operated video games	Video game systems	Home computers	Game software	Hand-held video games
1978	39924	75033		★	★
1979	★	78322	★	★	192318
1980	268130	285178	★	103928	241916
1981	704075	787231	29814	464361	114516
1982	836196	1204257	234747	1268575	134032

★Certain data have been withheld from publication to prevent the release of information about individual companies.

Source: Compiled from data submitted to response to questionnaires of the U. S. International Trade Commision.

- (1) The initial target market, affluent families with teenage males, reached near saturation in 1982,
- (2) There was a dearth of hit games necessary to trigger consumer interest, and,
- (3) sales were lost to computer manufacturers as they slashed prices and promoted the game-playing features of their home

computers.

3. Sharp Decline of Sales in 1983

The video industry, which had at first grown miraculously, was faced with serious difficulties in 1983. In the spring of 1983, some insiders began predicting the downturn of the video game industry. In the summer, layoffs of 1,000 were set at Warner's Atari. Warner Communication's stocks slid downward, because of sales decline of Atari. In the fall, it was reported that this industry would face a "tough Christmas" season (Landro, 1989). In the summer of 1984, the situations went from bad to worse. A quick review of articles in *The Wall Street Journal* reveals the sharp decline of this industry (Exhibit 2). The video game industry suffered a crushing blow. Finally, the industry sales dropped to \$100 million in 1985.

This sharp decline in 1983 may be analyzed from several points of view, some of which have been pointed out by Watkins as mentioned previously. Above all, the consumers or players of video games, mainly boys ranging from 8 to 18, grew weary of the deluge of video games. The more video games were put on the market, the more the quality of the games deteriorated.

Additionally, as the competition intensified, the video games became cheaper. When sales revenue declined, funds for research, development and investment ran short, which in turn led to further declining sales. These factors played serious roles in the deterioration of the quality of video games.

It was also predicted by some professionals that home video games would become replaced by personal computers. In *Home Video and Cable Yearbook* (1982-1983, p. 162), it has been pointed out that

EXHIBIT 2

Sharp Decline of the Home Video Game Industry:
Selected Articles from the wall Street Journal in 1983-1984

Date	Author	Title
1983		
June 27	L. Landro	Layoffs of 1,000 set at Arari by warner Communications
July 20	G. Gray	Warner Communications stocks 'continue slide as analysts' 2nd-period loss estimates grow
Sept. 8	L. Landro	Warner's Atari unit begins reorganizing under its new chief
Sept. 29	L. Landro	Video-game firms face tough Christmas as industry approaches a major shakeout
Oct. 17	L. Landro	Warner denies it is considering leaving computer business due to losses at Atari
1984		
Mar. 21	L. Landro	Warner's Atari Inc. will cut up to 260 white-collar jobs
Apr. 9	—————	Warner's Atari Inc. to shift some business, laying off about 550
May 21	L. Landro	Warner's Atari tries to end slump with new products and marketing
May 22	D. Kneale & L. Landro	Warner's Atari Inc. introduces machine in effort to revive video-game business
May 31	L. Landro	Warner's Atari Inc. unit plans layoff of 1,000 employees

“video games may be providing a way for the personal computer to gain entry into the home market.” The market of the home video game industry was regarded to become almost extinct.

4. The Appearance of the Nintendo Entertainment System

Nintendo of America was founded in 1980 as an American subsidiary of Nintendo. Nintendo, which is a Japanese company established in 1889 in Kyoto, has mainly carried on the manufacturing and sales of various kinds of cards, including “Hanafuda,” Japanese traditional cards.

Nintendo is a relatively late entrant into the home video game industry, although it produced some arcade video games such as Donkey Kong in 1981. Nintendo began selling a home video game named “Famicom” in 1983, which is an abbreviation of “Family Computer.” Some other companies such as Sega had already put home video games on the market in Japan, prior to Famicom.

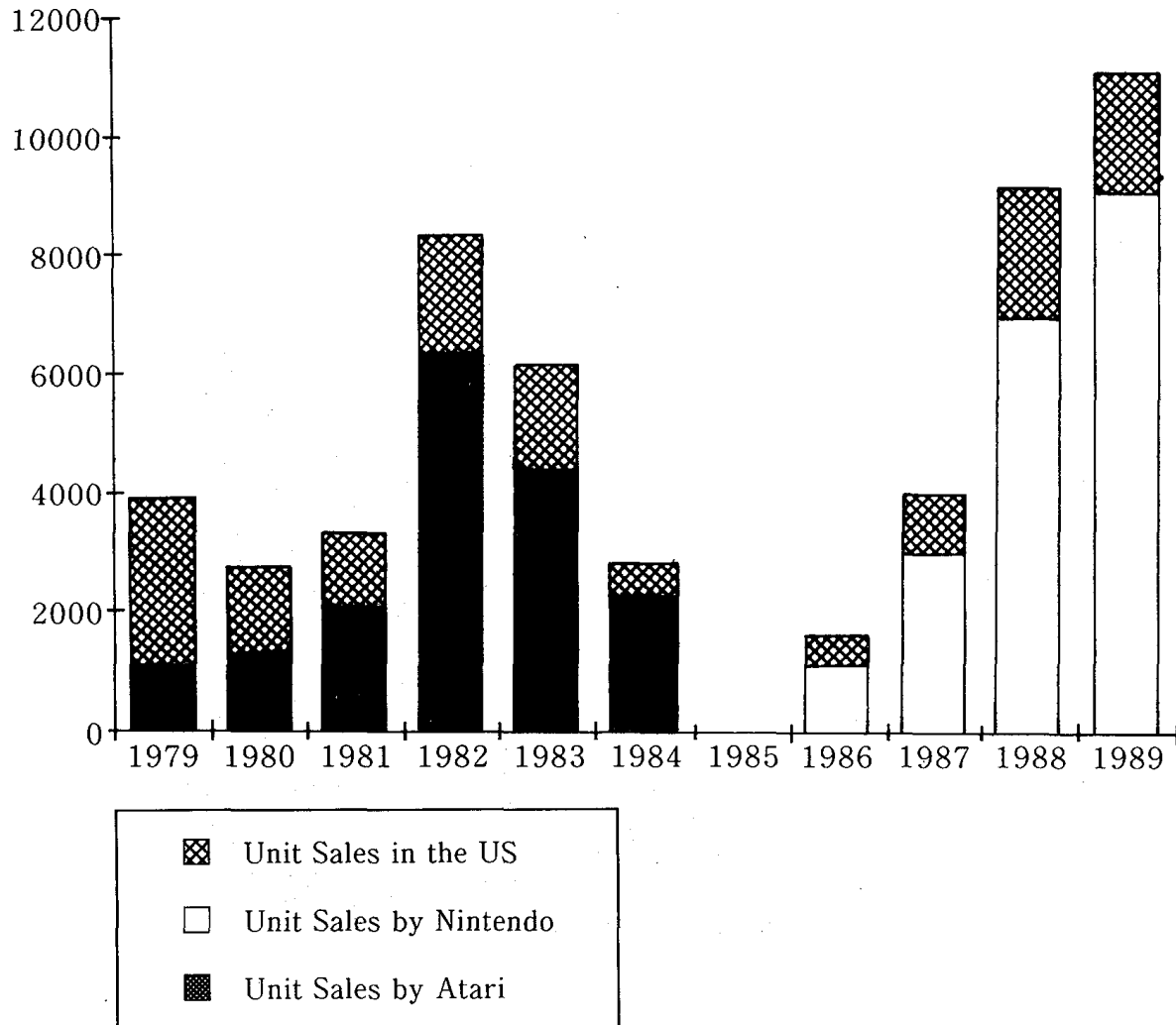
As soon as Famicom appeared, however, Japanese boys paid a lot of enthusiastic attention to it, and sales reached 6.5 million copies by 1985. “Super Mario Brothers” was the most popular game, which became the million seller in Japan.

To build upon this striking success, Nintendo began selling the Nintendo Entertainment System (NES) in the United States, accompanying Super Mario Brothers. NES is an American version of Famicom, although NES has no compatibility with Famicom. Nintendo carried out test sales in New York in late 1985. As a result of this test marketing, Nintendo started selling NES all over the U.S. in 1986 priced at \$100 for a basic system. Game cassettes to be inserted in the control deck cost from \$25 to \$30.

5. The Swift Spread of the NES in the U.S.

The sales of the NES skyrocketed in the United States. NES sold

Exhibit 3 Atari versus Nintendo in the US Home Video Industry



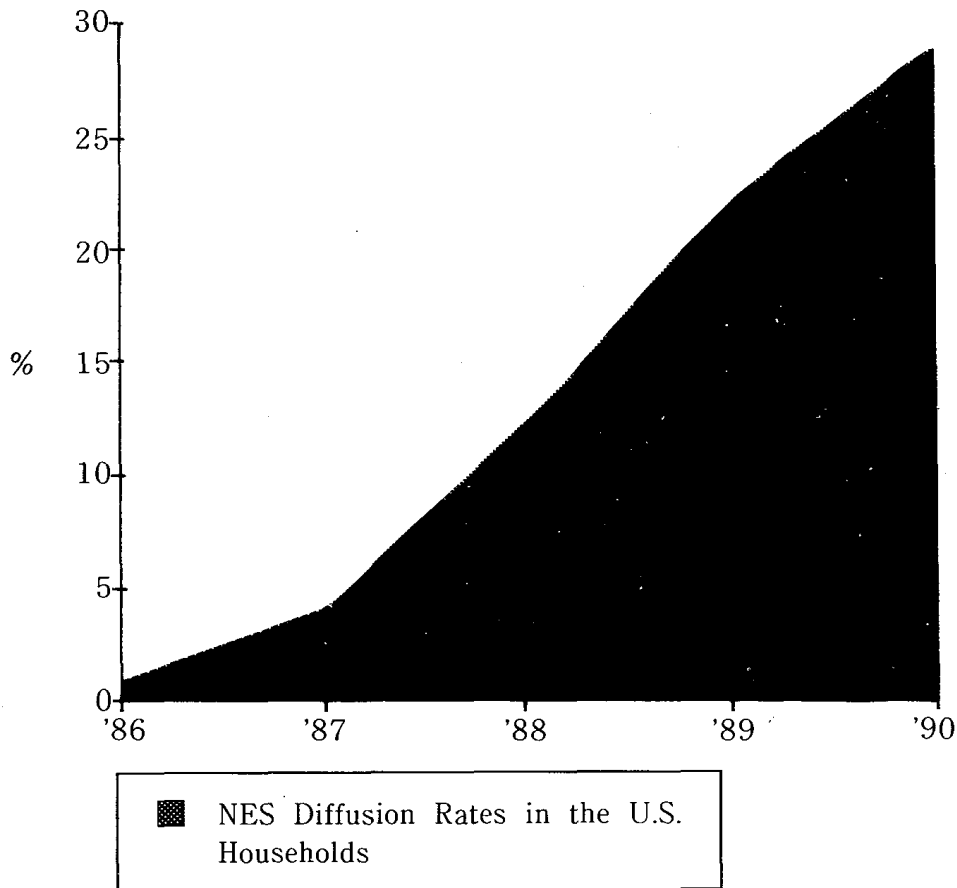
1.1 million copies in the first year and reached 20.2 million copies as of the end of 1989. About 80 percent of home video games which are possessed by U.S. households are thought to be NES. NES's sales are expected to reach 27.7 million copies as of 1990; that is, approx-

imately one out of three households in the U.S. will have NES (Exhibit 3).

The diffusion curve of NES is almost linear, as shown in Exhibit 4. This linearity reveals the tremendous and immediate spread of the NES, so that it is almost impossible to recognize the point of critical mass.

This success is due to the marketing strategies taken by Ninten-

Exhibit 4 NES Diffusion Rates in the U.S. Households



do, as well as the supply of friendly machines and attractive software. For example, Nintendo restricts the development of game software for NES severely, in order to maintain the quality of products and to prevent price decline.

Competitors like Atari reacted strongly against Nintendo's unique strategy. Although many companies are now willing to enter this once ruined industry, they have not necessarily been successful yet. Supposedly due to the strict licensing by Nintendo, various lawsuits have been spurred, ranging from the issues of hardware to those of software (McGill, 1989). Furthermore, with the diffusion of the NES, three evolving trends are appearing; many business persons have found that tremendous business opportunity now exists in the home video game industry. First, another use of NES has been experimentally carried out. Utilizing NES as a network terminal, various telecommunication activities are planned, such as banking, dealing of stocks and so forth.

Second, the miniaturization of home video games is advancing. In 1989, Nintendo and Atari put on the market a handy type of video game, called "Game Boy" and "Lynx" respectively, which can be installed by a cartridge to provide a game similar to the home video game. Game Boy is smaller and lighter than Lynx; while Lynx has a color picture, Game Boy merely has a black and white picture.

Third, advanced 16-bit machines have appeared since 1989, while NES is only an 8-bit machine. 16-bit machines have been sold by NEC and Sega, which are called "Turbografx-16" and "Genesis," respectively. Keeping abreast with these trends, Nintendo released "Super Famicom" on November 21, 1990 in Japan. It immediately sold 300,000 units when it appeared in retailer shops.

The swift diffusion of the NES has, therefore, brought about many reactions and evolving movements surrounding home video games. The sales of the home video game industry reached \$3.4 billion in 1989. There is no indication at all now toward decline, which

this industry once experienced. However, as Yamauchi, the president of Nintendo Japan, put it, "In this industry, there are only two room, one is in heaven, the other is in hell (Ikeda, 1987)." The home video industry should be watched carefully and continually.

III. TECHNOLOGICAL ASPECTS AFFECTING THE DIFFUSION PROCESS OF THE NES

The Nintendo Entertainment System appeared on the U.S. market in 1985, and it was composed of many kinds of attractive technologies. These technologies form the advantages relating to the attributes of the innovation in the diffusion process. The attributes of the innovation are classified in five categories: relative advantage, complexity, observability, trialability and compatibility (Rogers, 1983, p. 211). These attributes will be explained in terms of the technological characteristics of the NES itself and the technological compatibility with the external environment when the NES first arrived in the United States.

1. Technology Cluster

The machine of the NES, which is called a "Control Deck set," is exclusive to this system. As it has an 8-bit CPU (Central Processing Unit) in it, it can carry out various functions similar to a home computer. However, Nintendo dared to limit this function to the home video games, so that NES was able to obtain several advantageous attributes of the innovation for this kind of a machine.

First, it has attractive software and brilliant graphics, both of which are obtained by using an 8-bit CPU in a specific manner. Both

form the relative advantage of the innovation. Several persons who were interviewed for the present study told us that the brilliance of the graphics impressed them above all. The quality of the software application depends mainly on the CPU. Owing to the powerful machine, it became possible to develop many attractive home video games.

The most popular video games for young boys became role-playing games such as "Dragon Warrior," "The Legend of Zelda," and so forth. According to the interview results conducted for this study, many young boys about 12 years old are enthusiastic about these role-playing games, while young men in their twenties are seemingly not very fond of these games on the whole.

A player can create his or her own stories in the role-playing game. For example, in "Dragon Warrior," the player is a hero. He or she can select weapons against enemies, can choose a favorite route to reach the destination, and take treasures. This active shaping of the story by the player can be called a sort of re-invention (Rogers, 1983, p. 175). That is, the opportunity for re-invention is built-in. On the average, it takes 140 to 150 hours to "carry out the re-invention."

Second, because the NES was developed as an exclusive concept of complexity in terms of the attributes of the innovation. To use the NES, all that is needed is to plug and NES outlet into a television set, insert a cassette in the control deck of the NES, and turn on the television and the NES. After this preparation, anyone can enjoy playing the video game by using a controller, following the instructions on the screen. The controller is so simple that anyone can understand how to operate it within a few minutes.

Third, the trialability of the NES is excellent, because of the

elaborate marketing and the swift diffusion in the United States, as well as the ease of use. Besides, the results of a game can be obtained as soon as the game ends, so that observability is also excellent.

What is most important is the technology cluster which is the integration of technology, formed by friendly hardware, attractive software and their combinations (Rogers, 1983, p. 226). The attributes mentioned previously are not necessarily exclusive characteristics which the NES has. Actually, many of these characteristics are very common in home video games. However, the hardware of the NES is by far smaller and smarter, and the software of the NES is by far more attractive and more satisfactory, compared to those of home video games which prevailed around 1980. This highly enhanced technology cluster has certainly allowed the NES to diffuse so quickly in the United States.

2. Technological Compatibility

The technological compatibility of the NES with current technology has been a central factor in NES adoption in the United States. First of all, television sets, which are an absolute prerequisite for playing the NES at home, have diffused sufficiently in the U.S. to reach 813 sets for each one thousand inhabitants in 1986 (UNESCO, 1989, p. 427). Second, owing to the prevalence by 1980 of home video games like Atari CX-2600, whose sales declined abruptly in 1983, many people, especially young boys, knew what home video games were.

Therefore, when the NES appeared on the U.S. market in 1986, principally boys desired to buy the NES immediately. If the buyers of the NES had any resistance to making these purchases, it may have

been because of their bitter experience in the home video games before the advent of the NES. However, this resistance appears to have been overcome, at least in general. The success of the NES seems to be mostly due to the elaborate marketing strategy conducted by Nintendo and its subsidiary in the United States. This marketing strategy will be analyzed in the next section.

IV. NINTENDO'S MARKETING STRATEGY

1. The Success of "Famicom" in Japan

The Company Background

Nintendo Co., Ltd. is the largest manufacturer and marketer of video games in the world. A first video game system, a joint venture with Mitsubishi Electric Inc., was developed in 1975. After manufacturing a variety of electronic entertainment products, including "Game and Watch" —a hand-held video game— and coin-operated video games like Donkey Kong, Nintendo introduced an advanced home video game system known as "Famicom" into the Japanese market in 1983. Most recently, Game Boy, a personal portable video game system, marketed in 1989, has already significantly expanded the video game business.

Nintendo Co., Ltd. has increasingly been recognized as one of the best-managed firms in the world. *Business Week* listed Nintendo in the top third of the "Global 1,000" in 1989. *Nintendo Kaisya Annai* states that net sales for fiscal 1989 was 1,843 million dollars, an increase of 644 percent over 1985 (US\$1 = ¥158). The dramatic improvement in financial performance is the result of the popularity of Famicom (the Japanese name for the NES) and Game Boy. Nagatsuma (1990) estimates that Nintendo holds nearly a 90 percent market share of

video games in Japan, and more than 80 percent in the United States.

The Yamauchi family owns Nintendo. Hiroshi Yamauchi has been president since 1949 and owns 11.5 percent of Nintendo's stock. Yamauchi says, "At Nintendo, improvements in interactivity have appeared, not surprisingly, in hardware, software and terminals. But just as important is Nintendo's emphasis on interaction with its customers and game players" (*Nintendo Annual Report*, 1990).

The Founding of Nintendo of America

Nintendo of America Inc., subsidiary of Nintendo Co., Ltd., was established in 1980 in New York and later moved into Redmond, Washington. The president of Nintendo of America, Minoru Arakawa, who is the son-in-law of Yamauchi, aggressively began to market the Nintendo Entertainment System (the NES) in the U.S. in 1985.

Arakawa's business background in North America and academic background both in Japan and the U.S. helped Nintendo of America to seize the initiative in the United States. Arakawa previously had been an executive with Marc-Nard, a Canadian construction firm based in Vancouver, British Columbia. He received his bachelor's degree in civil engineering from Kyoto University, Japan, and a master's degree in civil engineering from MIT (Massachusetts Institute of Technology).

Famicom in the Japanese Home

Since 1983 Nintendo has marketed Famicom in Japan. The Japanese people have purchased over 15.2 million Famicom hardware units and over 183 million software cartridges (*Nintendo Kaisya Annai*, 1990). The penetration rate of the Famicom is more than 40 percent of Japanese households in five years.

The key factors in the success of the Famicom diffusion include sophisticated software, wide-range marketing segmentation and the competitive pricing of hardware:

(1) *Sophisticated software.* Nintendo controls the quality and quantity of software. Nintendo believes that one excellent game is superior to one hundred boring games.

(2) *Marketing segmentation.* Video games are targeted not only at children but also at adults of all ages. Indeed, the name "Famicom" is derived from family computer.

(3) *Price Setting of hardware.* Nintendo keeps the price of the hardware low at 94 dollars (US\$1 = ¥158) in Japan. Nintendo planned to make profits from the distribution of the software.

2. Introduction of the Nintendo Entertainment System in the U.S. Market

Evaluation of Atari's Failure

In the early 1980s, Atari, a competitor in the home video game market, failed. At Atari's peak, sales of the video game industry were 3.2 billion dollars; in 1985, only 100 million dollars. (Dekeles, 1990 p. 28).

Why did Atari fail, and what did Nintendo learn from Atari? We found that the main difference between the two companies lay in marketing strategy.

A flood of nondescript software by non-Atari manufacturers inundated into the U.S. market. Atari users lost interest. Atari did not provide controls to prevent this flood of low quality games.

In addition, Atari ignored the adult market and female users in general. The marketing segmentation proved wrong. Its preconception

about video games being only toys for children did not foster adult adoption or development of sophisticated software.

The Entrance of Nintendo in the U. S. Market

An important factor in the high-speed diffusion of the NES is that Nintendo seized an opportunity. In 1985, Nintendo entered the U.S. home video market and benefitted not only from the vacuum left by Atari's failure but by the familiarity with video game products that Atari had created in American homes. Atari users had already passed through the following innovation-decision process and then rejected Atari because of poor quality.

The following is the five stages of innovation adoption, applied to home video games. (Rogers, 1983, pp. 164-175).

- (1) *Knowledge Stage*: Consumers become familiar with video games and how they work.
- (2) *Persuasion Stage*: Consumers form favorable attitude toward home video games.
- (3) *Decision Stage*: Consumers decide to adopt games.
- (4) *Implementation Stage*: Consumers purchase video game units and use them.
- (5) *Confirmation Stage*: Consumers loose interest in video games.

Consumers experienced all five stages. Nintendo seized upon Atari's positive experience (stage 1–4), and took steps to avoid the confirmation stage and ultimate rejection that were the cause of Atari's downfall. On one hand, Nintendo's adoption time in the U.S. was sharply reduced, because Atari had already developed the market.

Nintendo did not have to break new ground. On the other hand, Nintendo avoided the poor quality issue with respect to the U.S. market, inasmuch as Nintendo already possessed high quality software developed for its Japanese market.

What remained for Nintendo was to focus on marketing strategy in the United states. Nintendo did not have to fear competitors. Most of them were scared off by Atari's failure. But Nintendo did have to interest bored consumers and guarantee quality.

Nintendo sold over 21 million units and penetrated into 27 percent of American households in less than five years (*Nintendo Annual Report*, 1990). NES's Marketing strategy and communication management will add to our explanation of this phenomenon.

3. NES Marketing Strategy

Nintendo's experience with Famicom and analysis of Atari's strengths and weaknesses made them implement two strategies. One, Nintendo should take steps to control the quality of its software cartridges and the market should be re-targeted.

Quality Control of the NES Software

Nintendo maintains its high quality software by means of a licensing system. The licensing rules were developed in order to avoid non-approved inadequate software.

Dekeles (1990, pp. 16-18) explains that the licensing system consists of three rules. First, a software supplier cannot develop software without Nintendo's approval. All the NES hardware contains "lockout" chips which provide security against illegal software. Second, a software supplier can introduce no more than five games in a year. Third,

no NES game can be introduced to another home video system within two years. Nintendo aims to protect the quality of its video games.

New Targeting of the Home Video Market

In October 1985, Nintendo America conducted an extensive test market in New York. According to Kobayashi (1990, p. 56) thirty project members delivered the NES units and 15 software packages to selected retail stores (*Nintendo News Release*). The test market revealed major differences in marketing needs between the U.S. and Japan and suggest the following strategies.

(1) In Japan, a manufacturer sells products to wholesalers, and the wholesalers distribute products to retailers. In the United States, manufacturers supply products directly to retailers. Nintendo thus decided to focus on retail outlets.

When retail outlets were established, Nintendo requested information as a frequent basis about total sales and the popularity of individual cartridges. In addition, a Nintendo Merchandising Inc. formed merchandising team, composed of approximately 150 persons, paid over 7,000 visits each month to Nintendo retailers in order to maintain company quality control (*Fortune*, November 5, 1990).

(2) To promote the diffusion of NES Nintendo developed retail character goods, as is common in the U.S. market. From its popular software, Super Mario Brothers, Nintendo created Mario dolls, huts and T shirts. A recent survey by Nintendo of America Inc., showed Mario to be more popular than Mickey Mouse among children ages 6-17.

(3) Nintendo's name has successfully penetrated among American

consumers. Users tend to say not, "I play video games," but, "I play Nintendo" (Dekeles, 1990, p.29).

(4) Nintendo targets adult family members, as well as children. This marketing strategy is detailed in the following section of this paper.

4. Characteristics and Categorization of Adopters

Another reason NES diffused so repidly is that Nintendo analyzed and targeted the market segment concerned. Atari's failure was due to its ignorance of the adult, and female markets. In this section we will analyze the characteristics and categorization of NES adopters. Based on sex and age, we categorize NES adopters into three markets: kids, adults and females in general, and family as a whole distinct target.

The Kid Market

Kids are categorized as early adopters, who played the most important roles in the diffusion of NES. Actually, in the early stage of diffusion, in 1986, 87 percent of users were kids (See Exhibit 5).

In our interviews, all kid adopters had known of NES when it was first marketed. However, the decision makers to buy were not kids but parents. There was somewhat of a time lag between product awareness and actual purchase. We gleaned several characteristics of kid adopters from our interviews:

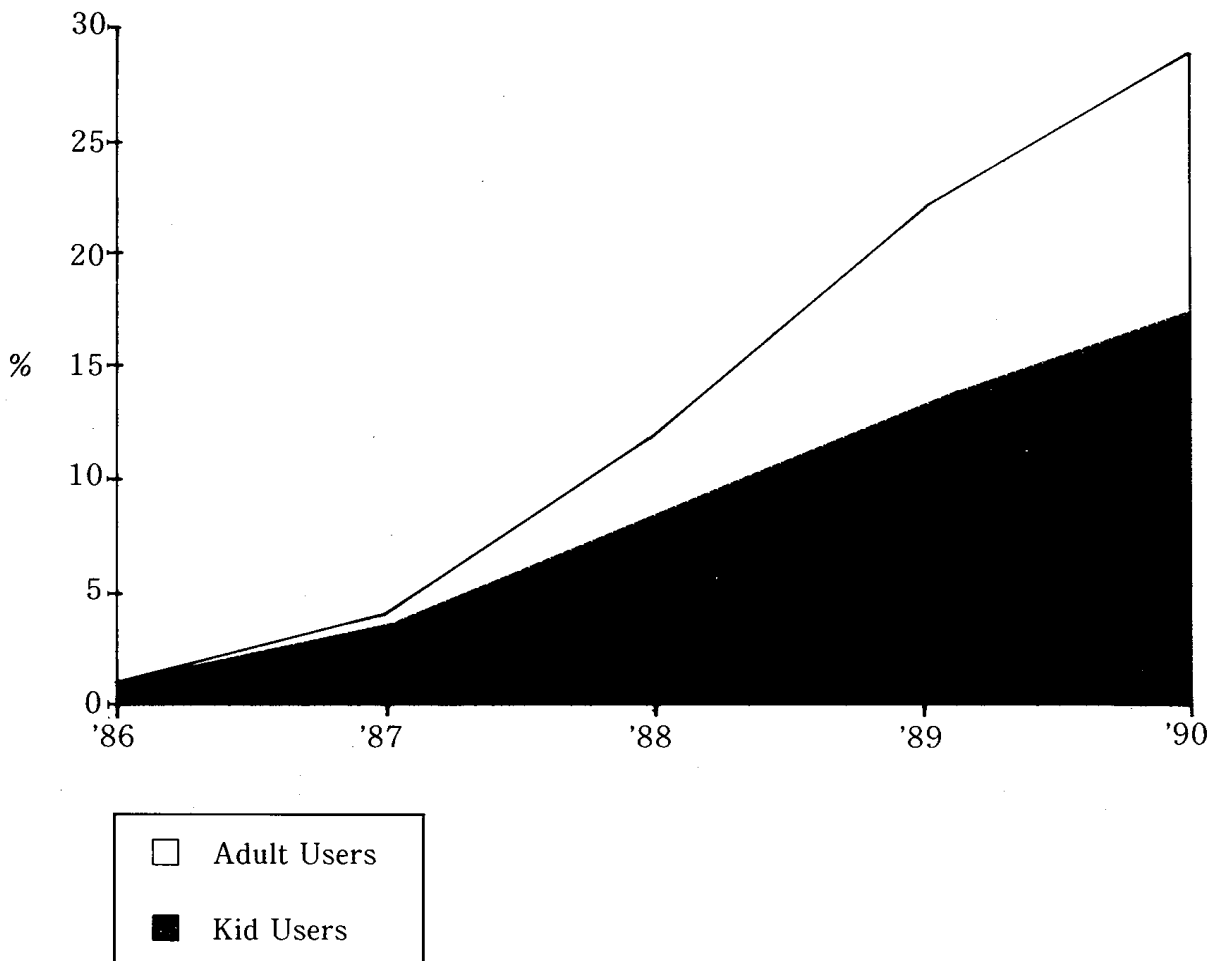
(1) They use NES for more social purposes than adults. It is important for kids to exchange games and play games with friends and families.

(2) Kids often have a lot of software, but almost everyone's favo-

rite is Super Mario Brothers.

(3) we cannot conclude that kids play more than adults. The average number of days a week on which adopters play is: kids on 5 day, adults on 5 day. The average playing time per day is: kids 1.4; adults 1.8 hours.

Exhibit 5 NES Diffusion Rates in the U.S. Households



Why NES had diffused so rapidly among kids ? Kids are open to entertainment innovation, and their group interaction promotes NES diffusion. Kids share experiences playing games and recruit other potential users. Also, elaborate advertising is aimed at kids, who are more vulnerable to advertising and who influence parents to

THE DIFFUSION PORCESS OF THE NINTENDO ENTERTAINMENT SYSYTEM IN THE UNITED STATES
purchase.

The Adult Market

Adults are categorized as late majority and divided into two groups. First, young adults without children play games for fun or relax. Second, parents play games with their kids for family entertainment. Adult users are important because they are the ones who decide to purchase the NES. In fact, 36 percent of current users are adults, and Nintendo is expanding to create more sophisticated games for adults (Exhibit 5).

The Female Market

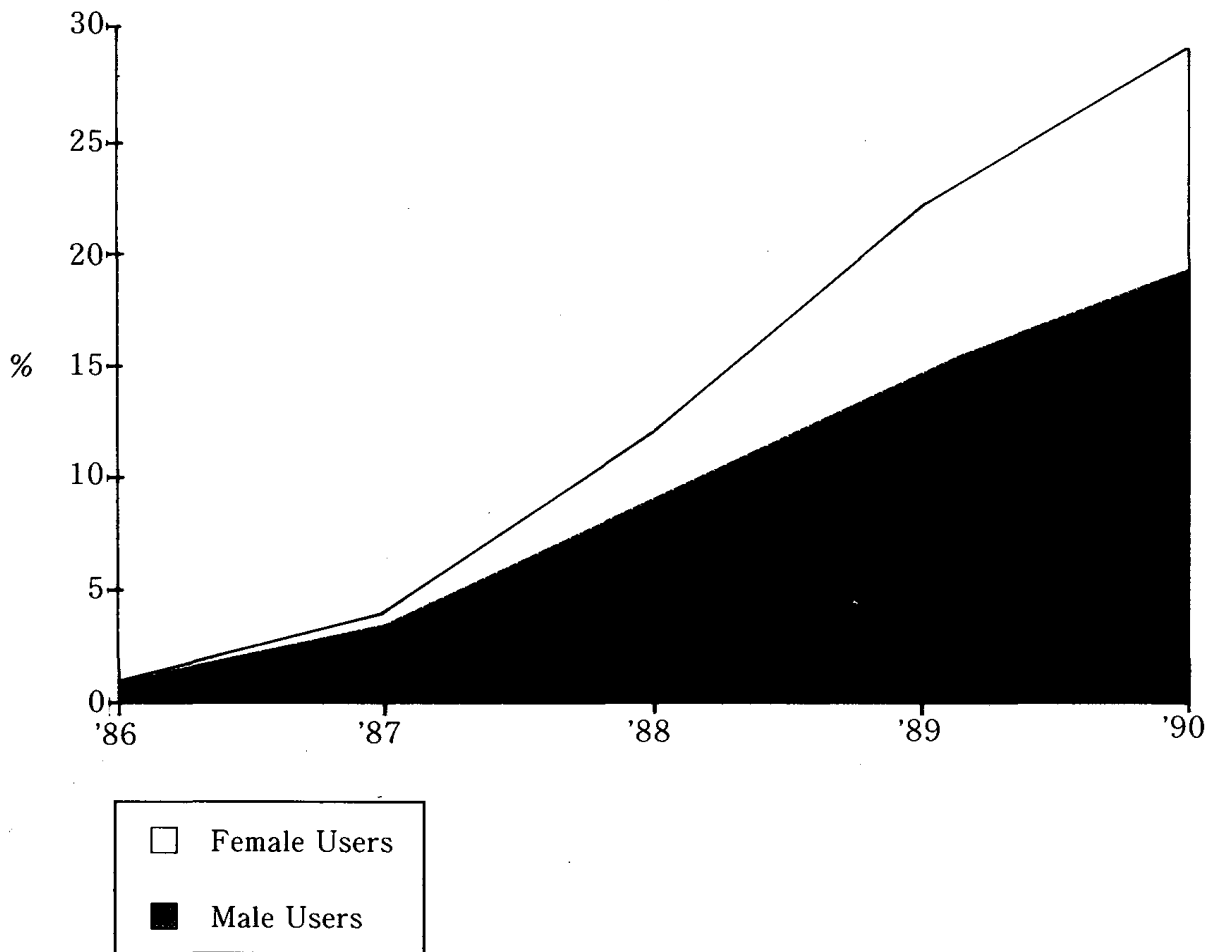
We categorized females as late majority for NES adoption, because (1) Females tends to have a negative attitude toward video games; they did not perceive the game as awkward. (2) At the first stage of NES diffusion, most of the video game software was action and adventure games. This software did not attract females.

Nintendo has since presented more types of games and categories with unisex appeal. Attractive displays and game characters prove appealing also female users. Female adopters of the NES have jumped to nearly a third of the total adopters (Exhibit 6).

The Family Market

The NES matches the family need to enjoy leisure time together. Especially for children, playing with siblings, fathers and mothers is a lot of fun. Such games allow families to learn cooperation.

Exhibit 6 NES Diffusion Rates in the U.S. Households -2-



5. Communication Management

Sarris says Nintendo is consumer driven. This represents its strength. Nintendo developed a variety of communication channels relating to NES in order to reduce innovation uncertainty; a user periodical, company-owned retail outlets, and fostering social and education activities involving NES games.

Nintendo Power: A Successful Consumer Periodical

Nintendo publishes a monthly magazine, *Nintendo Power*, a best seller among children. This magazine promotes new products and

keeps users interested. Readers get information on new software before the actual marketing begins, a tactic which stimulates users to buy the new software. The magazine also provides Super Mario players secret techniques to "warp" from one "space" to another, further encouraging users to continue to play NES. Finally, *Nintendo Power* provides market research on game players, and readers' response guides new NES software creation.

Game play counselors answer more than 5,000 telephone calls each week (*Nintendo Annual Report*, 1990). This telephone consulting service provides users with spontaneous solutions and allows users to voice their concerns about the games.

"The World of Nintendo"

Potential users can visit more than 6,000 "World of Nintendo" stores where they are actually play the NES. "World of Nintendo" provides a complete line of products and licensed items. This increases NES's trialability and observability.

According to an executive of Nintendo of America, "'World of Nintendo' outlets serve both retailers and consumers alike. Nintendo-identified merchandise allows for an assortment of Nintendo products to be merchandised effectively in a limited amount of space" (*Nintendo News Release*). Nintendo potential users are not only able to purchase NES hardware and software at local World of Nintendo retailers, but can also users obtain services such as warranties and repairs without delay.

The Social and Educational Application of the NES

In addition, Nintendo is developing social and educational uses of

the NES. These applications can work positively for the diffusion of the NES products.

Nintendo will be establishing a fund at the Massachusetts Institute of Technology's Media Laboratory to support research into how children learn while they play (*Nintendo News Release*). Dr. Seymour A. Papert at MIT is developing high-tech learning tools for his research that "look and feel more like Nintendo games than school books." If the NES can be seen to promote computer literacy, logical thinking, problem solving and creativity, parents will reduce their anxiety over their children's extensive usage of the NES.

Nintendo also has developed the NES Hands Free Kits for disabled people. Dr. Andrea Miano, recreational therapist at a San Francisco hospital notes that the NES Hands Free Kits "allow normalization by providing them a common ground on which to interact with non-physically disabled peers" (*Nintendo News Release*). This case suggests that the NES can be put to good use in a pro-social role.

6. Nintendo for the 1990s

The success story of Nintendo comes from its marketing management strategy, including software quality control, the customer-oriented services and segmentation of target. This customer-driven, interactive approach allowed Nintendo to establish communication links with consumers and marketers, valuable market insight from consumers.

Hurdles in the NES Diffusion

There are a few somewhat negative factors in promoting further diffusion of the NES. The home video game market looks too big to be

THE DIFFUSION PORCESS OF THE NINTENDO ENTERTAINMENT SYSYTEM IN THE UNITED STATES
dominated by one company.

The first obstacle is lawsuits against Nintendo's control of software. *The New York Times* (March 14, 1988) reported that Tengen, one of the major software manufacturers, sued Nintendo for allegedly violating antitrust laws by its strict software control. Then Nintendo countersued Tengen's piracy of patented technology.

Second, several powerful competitors have appeared along with the growth of video games demand. According to *Nikkei Business* (July 2, 1990), Sega, an arcade game hit maker, provides high-level software with 16-bit machines. Nippon Electric Company, a Japanese electronic manufacturing giant, has already manufactured software more sophisticated than NES.

Nintendo's Challenge for Further Innovative Diffusion of the NES

According to a survey by McCam-Erickson in 1990, Nintendo users still play NES games. Ninety-four percent of the NES owners said that the NES is "as much fun now as when it was first purchased." This statistic predicts Nintendo's further diffusion. NES adopters are satisfied with NES games and eager for more advanced products. What are Nintendo's strategies for the future? There are two important points here.

Nintendo aims to construct a computer network through the NES. The entertainment and information service will allow Nintendo fans to compete on-line, against players coast-to-coast. According to *Los Angeles Times* on November 20, 1990, the final goal of NES network allows users to communicate between Nintendo and its players, and between players themselves, and will greatly enhance the level of game enjoyment, particularly for those who enjoy competition. In

Japan, innovative plans have already been launched. A joint venture with Nomura Security company allows users to purchase stocks through the Famicom (*Nikkei Business*, July, 2, 1990). In addition, Game Boy appeals to players of all ages and skill levels. Game Boy has created a new category segment by taking video games out of the home. Networking, new use development and further market segmentation suggest the direction of NES diffusion.

V. CONSEQUENCES OF THE NES DIFFUSION

The swift diffusion of the NES all over the U.S. has led to various consequences, which can be classified into three categories: desirable versus undesirable, direct versus indirect and anticipated versus unanticipated (Rogers, 1983, p. 379). The arguments about the consequences of the diffusion of the NES are largely centered on whether desirable or undesirable effects are being brought about. Therefore, the consequences of the NES will be first described in terms of the desirable versus undesirable effects, and next other consequences will be mentioned.

1. Addiction or Not ?

When games for amusement such as home video games spread widely, it is inevitably argued that children will be addicted to the games so deeply that they will affect a bad influence on children. As children play the home video games addictively for so many hours, it is argued that they have no time to study, and, even worse, that they continue to think of games all the time. If correct, this could be called an undesired and direct consequence of the innovation, and probably

an anticipated one for the people who argue against the games. Actually, some facts concerning addiction to Nintendo ("Nintendo-haulics") have been reported (UMagazine, 1990). According to the interviews conducted for this study, one person is seemingly addicted to playing home video games a few hours each day. However, according to some survey result mentioned by Greenfield (1984, p. 99), playing time is not as long as anticipated, and it is time otherwise spent watching TV which is replaced by the time spent on home video games—an interactive medium.

It is even now uncertain that home video games bring about such undesirable consequences as addiction. However, in spite of the paucity of studies, some academic persons such as psychologists tend to be in favor of the home video games, while some social groups are opposed to them (Loftus, 1983, p. 182; Greenfield, 1984, p. 123).

2. The Cause of Violent Behavior

Another undesirable consequence which is pointed out primarily by social groups is that the contents of home video games have so many brutal scenes that they may cause violent behavior among players, especially children (Dekeles, pp. 1-16, 1990). However, it is very difficult in reality to distinguish one cause of violent behavior from another, and to specify the cause of violent behaviors.

3. Desirable Consequence: Teaching Skills for the Computer Age

Due to the rapid progress of information technology, various apparatuses relating to it have crept into the home. Personal computers and word processors are the typical equipment found, and people

are urged to become accustomed to these machines, so as not to fall behind the times. The home video games are, as previously mentioned, the application of computer and television technologies. Actually, an 8-bit CPU is used for the NES, so that it is a computer in itself.

It can be pointed out that using home video games like the NES will help players adjust adequately to the computer age. For example, players usually do not see instructions —there is virtually no instructions for the game— and the players have to explore many secrets by themselves. According to our interview survey, most persons do not read articles on how to play Nintendo. They enjoy playing by themselves or talking about the secrets with friends. This way of learning is good training for becoming familiar with other information technology such as computers, because the players become less likely to react negatively to a computer and have mastered the “learning by doing” approach which is often necessary in using computer software.

4. Creating a Desirable Consequence: Applications for Education

Nintendo is trying to create desirable consequences, as well as leaving consequences to chance. As described in the previous section, Nintendo donated \$3 million to MIT for the research of new learning methods. Multi-media education methods including the use of home video games have been proposed, and it was suggested that these methods would be very helpful for teaching children (Greenfield, 1984, p. 157).

This is an innovative and challenging experiment, because it will alter the common perception that home video games are addictive and harmful for kids' studies at school. If this attempt were to succeed,

various possibilities would open for home video games.

VI. CONCLUSIONS

The history of the video game industry is important for the analysis of the diffusion of Nintendo's NES, because the industry has experienced success, failure and rebirth in a single decade. Starting in 1979, Atari diffused rapidly, reached a peak in 1982, declined sharply in 1983, then finally collapsed in 1985. The reason for Atari's failure is twofold: first, Atari could not control the flood of low quality software; second, Atari was restricted to the children's market.

Nintendo introduced NES in the American market and achieved a 27 percent diffusion rate in less than five years. Now, we are ready to answer our main question, "Why did NES diffuse so rapidly?"

(1) Nintendo entered the American market at an advantageous time. Consumers already experienced the diffusion process and discontinued use. Users were eager for advanced home video games. There were few serious competitors.

(2) NES has the relative advantage in technology and is compatible in the American market. In addition, NES is easier to play and its observability and trialability exceed that of the previous video games.

(3) Nintendo provides superior software through quality control and its market targeting embraces American consumer needs.

(4) Nintendo is consumer driven. Nintendo puts forth much effort to reduce the uncertainty of its products. Nintendo promotes diffusion through a user periodical and company-owned retail outlets.

(5) Nintendo targets a wide market, including children, adults, females and the family as a whole.

(6) NES's main target, children are open to entertainment innovation and extensive group interaction promotes NES diffusion.

Nintendo is also trying to get two desirable consequences: the development of the NES as an education and as a rehabilitation tool. Nintendo Company Limited president, Yamauchi states in the annual report (1990), "We also owned a responsibility to develop our software to enhance education opportunities." Nintendo seeks to help young people open their eyes to computer uses. As a rehabilitation tool NES is already recognized. While there is discussion of addiction and violent behavior associated with NES, Nintendo is pursuing desirable consequences of NES.

Expanded use of video game system begins with technological innovation and wider usage. Although not yet available in the United States, "Super Famicom" sold over 300,000 of its new 16-bit units in just one day in November 21, 1990 in Japan. Game Boy, introduced in July 1989, is estimated to sell six million units in the U.S. by the end of 1990. These statistics predict a bright future for Nintendo.

At this juncture, Nintendo faces two possible alternatives. The first alternative is that Nintendo construct a computer network which allows users to compete interactively in games and use the system for home banking and other non-game services. The other alternative is that Nintendo focuses on manufacturing video games for family entertainment. It is not possible to do both at the same time due to the fierce competition already existing in the market.

NES ADOPTION INTERVIEW RESULT —1—

NES Adoption Interview Result

No.	Age	Sex	No. of days played/wk	Palying hours per day
1	28	Male	7	1
2	30	Male	2	1
3	21	Male	2	3
4	25	Male	7	3
5	21	Male	7	1
Young adult average			5	1.8
6	12	Male	3	1
7	12	Male	7	1
8	11	Female	1	1
9	12	Male	7	2
★10	14	M = 5, F = 4	7	2
Children average			5	1.4

Interview Interview Place

No. 1 — 5 11/ 9 /90 USC game arcade at the Student Union

No. 6 —10 11/11/90 Fox Hills Shopping Mall

★10th interview with 9 kids together

NES ADOPTION INTERVIEW RESULT —2—

No. of games owned	Year of purchase	Sorce of Initial contact	Favorite games	Game partner
6	87	Computer Netwrok	Dragon	Alone
4	86	TV	Contra	Alone + Friends
5	87	TV	Ninja	Alone
10	87	Sister	Tetris	Friend + Sister
5	88	TV	Vally	Alone + Friends
40	85	TV	Super Mario Bros.	Friends + Bros. + Parents
11	85	TV	Skator	Alone + Friends
5	85	TV	Super Mario Bros.	Friends + Bros. + Father
9	85	Magazine	Super Mario Bros.	Friends + Bros. + Father
5	85and89	TV	Super Mario Bros.	Friends + Bros. + Father

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