Interactive games, the first mass medium of the electronic era

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■ *How have videogames evolved from the appearance of Atari in the 60s and Nintendo Kids generation in the 80s until the present multimedia consoles and internet games industry? Which is the player profile and how much time do they devote to this activity? Finally, in what categories can videogames be classified? The author answers these questions and explains the main features which define the videogames industry nowadays.*

The history of video games in four stages

Legend has it that space engineers invented video games to kill time while the astronauts slept. While it might be poetic to think that the NASA science boffins had also imagined travelling in space in order to emulate the interstellar characters they had contributed towards making, the reality is more prosaic: the first game, called Space War, was developed in the MIT (Massachusetts Institute of Technology) laboratories in Boston in 1962.

The history of video games can be divided into four stages, each with a length of ten years.

First period (1965-1975): The children of the Atari generation

The age of inventors and the legend of the lab in a Californian garage.

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Let's take the example of Nolan Bushnell and the overwhelming success of the Atari society. When Bushnell was a student at Salt Lake City, he would amuse himself by simulating space combats on the university's large computers. His first product was called *Computer Space* and simulated a battle between a spaceship and flying saucers. Financially, it was a complete disaster and only sold 2,000 copies. He created his own company, called Atari, which meant "disaster" in the GO game he was a big fan of. In 1972, he invented Pong, a ping–pong game based on the elementary principle of action and reaction. At that time, the only market he aspired to was amusement arcades (1).

Second period (1975-1985): The war for the domestic market

In 1976, Bushnell sold Atari to Warner Brothers for $34 million, of which he received $15 million and a long-term contract as managing director. However, the company wasted no time removing him from his managerial position when it decided to carry out a restructuring to face the competition. The age of the cheery, slightly eccentric inventor was over and the era of managers and marketing specialists had begun. In 1976, there were 20 different companies manufacturing domestic electronic game systems. The same year, a Japanese engineer invented **Pac-Man**, which had the effect of a small bomb on the evolution of the video game and meant that the importance of graphic design could no longer be ignored. Another important breakthrough was development of a friendly figure as the main character in the game that users could identify with.

This period of developing domestic video games coincided with the introduction of the personal computer. In 1977, Apple IIs began to be implemented commercially and the microcomputer revolution began. Shortly afterwards,

amusement arcade games took off, both financially and aesthetically (the creation of scripts and the use of graphics to create a realistic effect).

In 1982, Americans spent $8 billion in amusement arcades, while the domestic video game market was worth $3 billion, with 25 million consoles installed.

Throughout this period, companies were tossing up between two different strategies: developing electronic games based on the domestic microcomputer or launching a specific console on the market.

Third period (1985-1995): The era of the Nintendo and Sega giants

Following a period of recession that lasted three years, the arrival of Nintendo and Sega saw business take off again and new milestones reached. A product-marketing structure analysis shows the two Japanese shoguns used dumping with regard to the hardware market and made maximum use of games (i.e., software). They did not create all their games, but scrupulously controlled their authorised creators. This end-of-line profit strategy is characteristic of the physiognomy of cultural markets, i.e., the hardware costs practically nothing for users, but companies make profits through product sales (software) and services.

A new generation of software appeared. Star creator Miyamoto developed the Mario Bros generation for Nintendo. Miyamoto worked particularly on making movement as natural and complex as possible (the characters could walk, jump, roll in the air, move side to side and up and down, shoot while they walked, etc.).

The two features of this period were business concentration and hardware specialisation. Game customers were also defined more precisely at between eight and 18 years old. There were four game categories: action/adventure, action/arcade, simulation and sports.

At that time, the worldwide market was carved up by two the giants, Nintendo and Sega. Nintendo (a company that had been making card games for a century) launched its first equipment in 1985. Within three years, it had sold 11 million consoles and dominated the market (80%). It was followed by Sega (15%), which specialised more in amusement arcade games. With regard to portable consoles, Nintendo's Game Boy was the unrivalled leader, although its technology was inferior to that of its competitors. There was also Game Gear (from Sega), Lynx (Atari) and TurboExpress (NEC).

Fourth period: Interactive multimedia and Internet games arrive in 1998

Memory capacity and computer processing speed had to be developed to make the most of game graphics and to provide much more realistic sound, more complex scripts and to accelerate image-processing speed, and so electronic games gave way to **interactive multimedia**. 16 bits were the transitional technology. Most products these days are sold on CDs or DVDs and most have 3D images thanks to the development of *middleware* (2) visualisation software, which give the characters and sets a quasi-real aspect. Paradoxical though it may seem, the more imaginative the stars and situations became (creation of invented worlds and simulation), the more real they appeared to users.

Three big consoles have appeared since the year 2000 that make it possible to treat images in 3D. In order of appearance, they were:

- Nintendo's GameCube
- Sony's Playstation II
- Microsoft's Xbox (actually a computer that provides an Internet connection for online games).

At the same time that Microsoft was arriving on the scene, Sega was getting out of the manufacturing industry to dedicate itself exclusively to game creation. In the area of portable consoles, Nintendo continued to lead the field, way ahead of the rest of the pack (there was also GameBoy Color and GameBoy Advance).

All the new games came on CDs or DVDs and could work with computers, as PCs were becoming increasingly powerful and could process interactive multimedia. The difference between a console and computer game became less clear and people talked instead about games that could be played individually or online over the Internet, with games being bought on CDs or DVDs and the corresponding page accessed on the web. For example, game manufacturer Blizzard managed its Battle.net website, a large portal where it presented its best-sellers like Warcraft (I, II, III), a fantasy strategy game, Starcraft (I, II, III), a real-time strategy game (the most popular game on the Internet) and Diablo (I, II), a role game. Battle.net is a

very sophisticated portal with a complex chat area, a results list, merchandising store, etc. By way of example, on 10 April 2003 there were 198,665 players online and 72,661 games in progress. There were versions in English, French, German and Spanish, among other languages. GameRanger was another universal portal offering over 114 games of all types, e.g., Nascar, Civilization, Aliens vs Predator, Quake, etc. Nintendo had its own portal where it offered cult games like The Legend of Zelda and Luigi's Mansion, the Sega games about Wario, etc. The best known French-language portal, MADJNET, included a black list of cheats and organised tournaments, provided assistance and featured an online store and updated information about the game world and its products and services.

Player profile

Console games (e.g., Nintendo or Sega) were originally aimed mainly at adolescents and preadolescents, i.e., the so-called *Nintendo kids* generation (as they were called in the 1980s). These players are now about 20 years old and most continue to be hooked on games.

The statistics (3) are interesting: 58% of regular console game players are over 18, as are 72% of regular computer game players. Console and PC players are generally aged 12-35, and have an average of 28.

New games classification

Game type	Game examples	Manufacturers
Action **(often difficult to differentiate from strategy games)**	Die Hard, Die Hard: Vendetta Aliens vs Predator The Operative: No-one Lives Forever Dark Angel	Sierra Blizzard Infogrames Nintendo
Leisure	Traditional games Card games Tarot Chess	Sierra Blizzard
Role games	King Quest 8 Fantasmagoria Trone of Darkness Civilization Ever Quest Diablo	Sierra Blizzard Infogrammes
Simulation	Racing tracks: Nascar, Grand Prix, Gran Tourismo, Grand Theft, Auto Vice. Plane piloting, flight simulators. Sports: baseball, football, golf, etc.	Sierra Infogrammes
Strategy	Caesar III: Emperador Empire EarthRainbow 6 Warcrafrt (I-II-III)Starcraft (I-II-III) Myth (I-2-3)	Sierra Blizzard Infogrammes

Although most users are males, there has been a considerable growth among female players in recent years. An IDSA survey found that 39% of regular PC players and 26% of regular console players were female. This figure dovetails with the psychological profile of Internet users: girls consider the computer and Internet to be a useful tool, while the more technologically minded boys are particularly keen on leisure applications.

A survey LARIS is currently doing at the UNESCO-BELL Chair (4) at the Université du Québec in Montreal with people aged 15-25 is aimed at finding a more precise definition of players with respect to the use they make of the mass media. The age when people play most is clearly 14 to 15. The practice then drops sharply and although they continue to play, use is much more sporadic. In general, game fans are technophiles and have a great deal more electronic material than other adolescents. All game fans have a computer and do activities on the Internet. 18.8% spend 20-25 hours a week online and 22.6% more than 25 hours. Consequently, 41.5% are very regular users, also known as *heavy users* or *core gamers*, while the average amongst their age group in general is only 15.1%. Fans use email to the same extent as other adolescents, but 85% chat online, 13% more than other young people.

The study also found that this leisure practice affected the time they spent in front of the TV, but not only did playing games not decrease other online practices (Internet, television, music, etc.), it actually increased them. More than 50% of them watched television while surfing the Net, i.e., 10% more than other young people (5). In terms of taking advantage of time, game fans are extremely active when it comes to electronic hobbies but more reluctant to devote time to social activities or paid work, as the following table suggests:

Weekly activities	Players	All young people
Television	15.5 h/sem	12.1 h/sem
Internet	11.9 h/sem	8.9 h/sem
Music	11.2 h/sem	10.8 h/sem
Videogames	12.8 h/sem	5 h/sem
Sports	9.5 h/sem	8.4 h/sem
Social Activities	9.2 h/sem	11.2 h/sem
Paid work	4.4 h/sem	9.7 h/sem

Another study, carried out by CEFRIO (6) in 2003 on the profile of 12- to 17-year-olds who used the Internet found that girls preferred email communication, while boys preferred online games. In general, parents bought a computer to "facilitate" their children's homework. But, perhaps to their surprise, adolescents in Quebec spent three times less time on schoolwork on the Internet than other leisure activities.

Actividad	chicos	chicas
Online games	70.7 %	40.6 %
Email communication	63.2 %	81.3 %
Online chats	60.6 %	72.4 %

Game types

There are different ways to categorise games:

1. By support

- Games that use specific consoles, e.g., Microsoft X-Box, Sony (PS2 or PSX) or Nintendo (Game Cube, Gameboy Advance) that use a television or video screen.

- Games that use a personal computer (PC or Mac) and are sold on CDs and DVDs.

- Games that completely or partially make use of the Internet (DVDs downloaded to the computer but in connection with other players over the Internet).

- Games that can run on mobile phones, use satellite antennas or wire networks. They can currently be played anywhere, e.g., in planes, bars, etc.

2. By location

- Amusement arcade games that require special rooms or heavy machines.

- Domestic games that can be used at home or at the office with their own equipment.

3. By content

- Adventure games
- Role games
- Air, space or sea combats

- Flying planes or driving cars or other vehicles
- Sports simulation
- Action games
- Group, individual or card games
- Reality simulation (e.g., Simcity)
- Finance games
(stock market simulations, monetary games)
- War games and strategy simulations
- Educational games for children
- Web-based games

4. By age

- Games for children (often defined as educational, beginner's/learner's or expression).

- Games for preadolescents and adolescents, i.e., video games using specialist consoles, e.g., Nintendo, Microsoft or Sony. There was a period when Mario Bros (from Nintendo) and Sonic (from Sega) dominated the adolescent world, but there were many games marketed by independent companies with hardware manufacturing licences.

- Games for adults to use with computers or over the Internet.

5. Degree of closure

James P Carse (7) has proposed another type:

- Finite games, where the point is to follow particular rules to reach a specific goal.

- Infinite games, which propose beginning the game and playing without any final limit. These work in various directions and are not governed by strict regulations. Winning is not the goal, as they can be played indefinitely. Some people consider these types of games to be a form of social exchange that record the infinite variety of human relations. These web-based games (which were initially quite primitive, such as Palace) or Dungeons & Dragons gave rise to groupware applications that have led to virtual communities where work is organised into teams, etc.

Games are usually multiform, multiplatform and hybrid. Sometimes they are developed on one type of support and later adapted to another. We can find games everywhere: from amusement parks (where enormous, incredibly real environments are created) to specialist establishments like amusement arcades, at home, on television, on the Internet

and, today, on aeroplanes, mobile phones, etc. – in short, anywhere where people have to wait, where they can get bored and where they may want something to distract them. Very often games have different lives. Taking into account their relative degree of universality, creativity is very important in this sector, although copies, adaptations and influences are also common practices among game creators.

Cultural and social analysis

Are video games a regular media? The answer to this question has been repeated often: video games are the most important media of the new generation of interactive media. The market is international and the investments earmarked to them are of the same order: from $100,000 to $4-5 million or more. According to the *New York Times*: "Activision and Electronic Arts, which produced Spiderman and The Lord of the Rings: The Two Towers respectively, have profited from this evolution of the sector. The most eagerly awaited product at the moment is still in the production phase and has been given the title *Enter the* Matrix. This game has been designed and manufactured by Shiny Entertainment and is expected to hit the market next spring (May 2003), in conjunction with the film Matrix: Reloaded, the sequel to Matrix. Some video game industry experts have estimated the budget needed to produce Enter the Matrix at $20 million, as a result of the very close collaboration up until now between the producers, actors and video game creators. In fact, the producer and actors shot some of the film sequences so they could be integrated into the game. In some scenes, the actors had to wear special clothing with sensors so that 32 cameras could record and later simulate their movements"(9) .

As you can see, there is a close relationship between the film industry (or to be more precise, a certain type of Hollywood film) and video games, as they are conceived with the same digital technologies and special effects. There are also many video games inspired by TV shows, cartoons, real events (e.g., sporting events or even wars, e.g., the Gulf War), atmospheric or environmental disasters, or historical events, e.g. the Gallic War, Roman invasions or the great epochs of the Middle Ages. There is no doubting the

Player characteristics	All	Skilled
COMPUTER ACCESSORIES		
Printer	88.2%	100%
CD recorder	57.6%	79.2%
Sound system	55.2%	90.6%
Scanner	36.0%	60.4%
Joysticks	33.7%	100%
DVD reader	21.2%	34.0%
Digital camera	15.2%	24.5%
INTERNET		
Internet access	87.9%	96.2%
High-speed connection	48.8%	58.5%
DOWNLOADING ACTIVITIES		
Games	33.7%	100%
MP3 (Music)	73.1%	98.1%
Videos	49.2%	83.0%
Images (i.e. photos, etc.)	66.3%	73.6%
P2P (8) (peer to peer) software	37.0%	64.2%
MP3 music reproducer (Winamp)	31.9%	56.6%
COMMUNICATION		
Free email service (e.g., Hotmail)	57.6%	71.7%
Chats: general	73.1%	86.8%
with friends	67.0%	86.8%
with strangers	42.4%	56.6%
FAVOURITE WEBSITES		
School-related sites	25.6%	3.8%
Informational sites (news, weather, etc.)	31.0%	18.9%
Cultural sites (art, shows, entertainment)	33.0%	15.1%
Leisure sites (sports, hobbies, etc.)	43.1%	49.1%
TV and radio stations on the Internet	17.2%	34.0%
Technology and IT sites	15.8%	45.3%
Video game sites	44.4%	100%
These players are "telesurfers", i.e., they watch television while also surfing the Internet	45.5%	56.6%

influence of films and shows such as Star Trek, Star Wars, Quake or Doom, among others. For example, the game Dark Angel is directly based on the James Cameron TV series. The film Die Hard stars ex-cop John Maclane, who is also the hero of the game Die Hard: Vendetta. Rainbow 6, based on the Tom Clancy book, represents a struggle against international terrorism led by an international defence organisation at the end of the 20th century. All these games recreate worlds that are modified in real time and based on the age of the Greek or Roman empires in fantasy medieval or contemporary scenes. Starcraft III, the cult game by Blizzard, brings life to three races that confront each other: the Terrans, Protoss and Zergs. Multiple space combats are necessary in all these worlds, as are assaults on planets and secret infiltrations of enemy bases. Battles take place in a great variety of environments that have to be explored in order to be controlled: space, snow and ice, forests, etc. This new generation of games makes Nintendo's Mario Bros and Sega's Sonic look like old-fashioned children's toys.

Ethical problems to take into account. Some people say that, "the origin of the success of video games is attributed to their violent connotation. However, only 20% of console games and 15% of computer games are violent, and only 9% of games use firearms. There is an exponential growth of web games, basically dominated by non-violent games like group and strategy games (10)". In the wake of massacres led by young people in the United States, e.g., in Littleton and Kentucky, various judicial processes have been started against console designers and manufacturers. Counsel for the prosecution David Grossman put forward the following theory: "Video games are violence stimulators that could perfectly be confused with the simulators the army uses to teach soldiers to kill efficiently. The massacres that have taken place are a new video game on a national scale. In this case, the prize is seeing your photo in Time magazine and on all the television channels in the United States". He was not too wide off the mark. In fact, the American army did use interactive first-person shooter game adaptations as training simulators for the Marine Corps (11) . The first Gulf War gave us images of troops playing war games in their combat vehicles to kill time. Where does reality end and fiction begin? During the second Gulf War, TV viewers were constantly reminded it involved real deaths, that the blood they were seeing was real. Many Americans were shocked when they saw the shootings that had taken place in the schools, but approved the intervention of the "Anglo-American coalition" to fight the

axis of evil and free the poor Iraqi people from tyranny. In a 1999 survey carried out by CNN, 58% of US citizens wanted the government to strictly regulate violent games, but paradoxically 90% of the people who buy games are adults. An IDSA poll (12) found that 46% of players were under 18 and 25% over 35. And I know a handful of action and strategy game fans who are convinced pacifists.

The debate about the consequences of violence in the mass media are still far from being resolved: catharsis or culture of violence? Following the line of the great thinker on IT culture, Sherry Turkle (13) from the MIT, I believe that video games work in some way as a "metaphysic machine" which makes it possible to experience infinity, to eternally relive a life while changing the conditions of existence, people, environments or solutions. The thing that fascinates young people is that they are able to control their universe, as adolescents are often immersed in a world in which they do not understand many things. Some players even end up thinking that if it weren't for the fact that they got tired or other limits on their own nature, the game could go on indefinitely. It is a perfect mirror, the only place where people can set themselves a purely intellectual challenge and invent their own, made-to-measure world. The game is where we can find our I in its pure state, where we can feel perfect or work ourselves to the bone (14). But there is more to it than that.

The debate about the values that electronic games transmit has just begun and will have to be examined in more detail.

How does the industry work?

Among the different leisure sectors (film, television, music, etc.), games are expected to grow the fastest in terms of income, at a rate of 9.3% between 2000 and 2005. The game industry is a mass market.

- In 2002, retail sales around the world reached $30 billion, a figure that exceeded the film industry in terms of box office sales.

- Although equipment (consoles) drives the industry, games (content) are responsible for generating two-thirds of profits. All the market components, i.e., equipment (hardware), game applications (software) and online

services increase sales, both with regard to console and PC and laptop games. This phenomenon of continual growth can be explained by the fact that the materials are evolving and becoming increasingly powerful, which means that software and applications must be updated. The number of consumers is also rising, as the Nintendo kids are growing up but continue to play and because women are playing more than before.

- There are three big markets for game sales: North America (42%), Asia (33%, mainly Japan) and Europe (25%).

- In 2001, console games represented the most important sales share, with 57%. Next came computer games with 22%, followed by the 21% shared by portable consoles (Game Boy Advance), wireless equipment (PDAs, cell phones, etc.), online games and other alternative platforms.

The interactive game sector is a creation industry with an international market scope. There are few examples of games created only for a local market. As a general rule, local adaptations are sometimes done, but they are not very useful because there are generally no dialogues and only music or sounds and the characters are usually fairly schematic.

Overall, the industry is a typical culture industry, like the film, music or book sectors. 80% of profits come from new products and 20% from catalogue items. "The very short lifetime of games, compared with other cultural products, exercises even more pressure on the need to generate profits quickly, which can only be provided by "hits," i.e., titles with average sales of more than a million copies (15) ". However, in the same way as films and books, it is impossible to predict success (less than 5% become best sellers (16)). This means that sector companies continue to be financially very fragile, due to increasingly astronomic creation expenses, and just one big flop can lead to the loss of a small or even big player.

The value chain

There are many intermediaries between the creator and consumer and it is important to understand the part each factor in the chain plays in terms of control and power.

Producers are a key part of the chain, as they are the

people who create and develop the games. This is very complex work, requiring great creativity and excellent technical and administrative abilities (a team made up of heterogeneous people such as designers, scriptwriters, graphic designers, programmers, interaction specialists, etc., coordinated by a project manager able to ensure that everybody works together, respecting terms and budgets (17)). We can generally distinguish between:

- Independent producers (who act as suppliers to other publishers)

- Associate producers, who carry out "studies" that belong to publishers or console manufacturers or who work for them.

It is calculated that some 20 important medium-sized companies in the world produce two to three titles each year, and over 1,000 SMEs (18) bring one or less than one new title to the market.

Publishers generally take a large part of the profit obtained, depending on the financial risks they have assumed and because they control access to the points of sale.

The game industry in the world

Three or four countries are major players, of which two - the United States and Japan - work in all sectors of the industry.

The US has one of the three console manufacturers, i.e., Microsoft (Xbox) and various important publishers (Electronic Arts, Activision, THQ, etc.). Its titles represent 44% of the market and the three big areas of creation are California, Massachusetts and Texas.

Japan has two of the three hardware manufacturers, i.e., Sony (PS2 and PSX) and Nintendo (Game Cube and Game Boy Advance) as well as major publishers (Nintendo, Sony, Konami and development studies which make up 35% of the world market).

France has two international publishers (Infogrames and Ubi Soft) and various development studies located in two main areas, Paris and Lyon. The United Kingdom is the third centre of creation, with 270 small and big companies in all the sectors.

The interactive games industry value chain
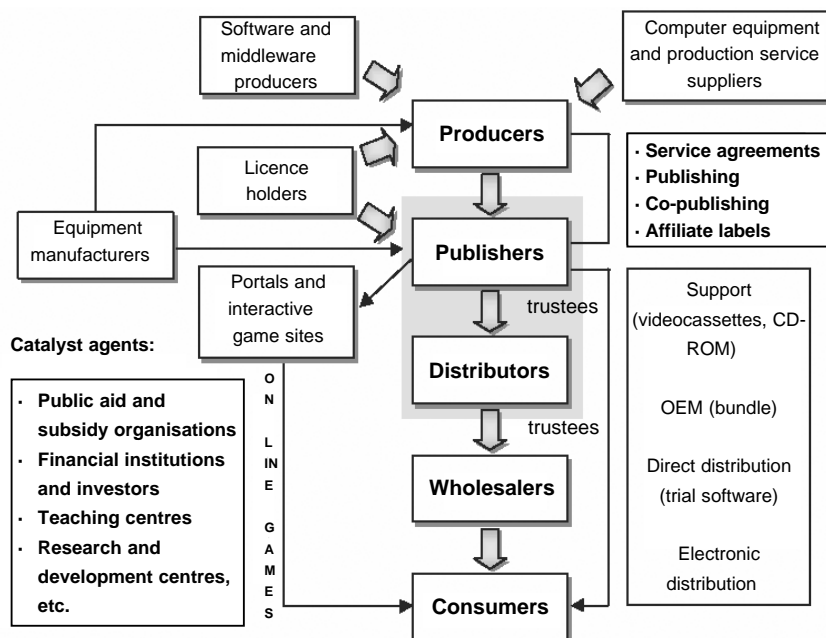
Source: Secor Conseil, 2002

Notes

1. This comprised specialist game establishments. Previously, there had only been pinball machines that worked mechanically, but they were gradually replaced with increasingly powerful and sophisticated electronic machines. Some were real bubbles, i.e., they created complementary hermetic environments.

2. Middleware companies currently have a wide variety of tools, including artificial intelligence, artificial life, simulators and plug-ins, which allow manufacturers to speed up their work and specialise, e.g., Aoftimage or Lateral Logic.
   Source: IDSA, Interactive Digital Software Association, (bulletin-alliance@numeriqc.ca)

3. LARIS, Laboratoire de Recherche sur l'Ingénierie Sociale at the UNESCO-BELL Chair at UQAM
   (http://unesco.bell.uqam.ca)

4. These young people have been called "telesurfers", a term that comes from the contraction of the words "television viewers" and "web surfers".
   CEFRIO (Centre Francophone d'Informatisation des Organisations) http://www.infometre.cefrio.qc.ca/

5. Communication established directly between computers, without the need for a specialist server or any other interconnection equipment.

6. Software examples: Canadà, Kazaa, Morpheus, Napster (currently pay-to-use); e-Mule (in French) or e-Donkey (in English). These types of software make it possible to exchange music, videos, games and other files.

7. Carse, James P. (1988), *Jeux finis, jeux infinis: le pari métaphysique du joueur* (Finite and Infinite Games), Paris, Éditions du Seuil.

8. The "x to x" model is the opposite of the customer-server model. The principle is as follows: the Internet user downloads and installs a program that allows him to provide other users with the resources available from his computer or a space on his hard disk where he saves all the files he wants to share. This system gives the other person direct access to the first person's hard disk.

9. NYT 20/02/03, "A Thin Line Between Film and Joystick".

10. CESAM multimedia consortium, Líndustrie du jeu interactif: rapport de veille, ISBN 2-9806208-1-5, Quebec, 1999.

11. Riddell, Rob, Doom Goes to War, Wired magazine, April 1997, page 114. A team from the American army adapted the game Doom for this purpose.

12. The IDSA is the main professional association of game publishers, responsible for 85% of sector sales (website : www.idsa.com).

13. Turkle, Sherry, Les engants de l'ordinateur (The Second Self), Denoël, Paris, 1986, page 77.

14. See the report the author of this text prepared for the UST laboratory at CENT (the Centre National des Études de Télécommunications), currently France Télécom R&D. This report is entitled "La télévision et les Nintendo Kids", Paris, May 1993.

15. Secor Conseil, Analyse du positionnement de l'industrie du jeu interactif, study carried out for the government of Quebec, 30 January, 2003.

16. According to Patrick Prémont from Teneon Technologies, one in 35 companies recovers expenses and one in 140 makes a profit.

17. To manufacture games today, it is impossible to have teams of fewer than 20 people.

18. Small and medium-sized enterprises

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