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Innovation in the video game industry: the role of Nintendo

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To those who belong to my past,
that have made me what I am

and to those who belong to my present,
who give me the strength to advance

Foreword

Writing a paper with the gaming industry as one of the main themes may seem, in the eyes of the reader that is not properly involved in the subject, as something atypical and far from the academic conception of what should be debated in a thesis. However, in a work that concerns Economics, even an industry dedicated solely to entertainment like that one of video game can be an interesting challenge. Moreover, each thesis should aim to develop researches on new topics and to process the results. What better way to do this if not by exploring overlooked fields of research?

The idea of a work involving Nintendo company as the main topic was among the possible research options, and choosing it as the theme to conclude the Master Degree was the goal I had proposed to myself for a long time. The involvement of the subject of innovation comes from the belief of its importance; since these two themes, innovation and Nintendo, could be easily combined, it was natural to create this work in some way dual.

Making available to any reader topics so far from usual ones, without sacrificing the academic character of the paper, was both a challenge and a target. For this reason the work was built in such a way as to guide the reader gradually in the gaming world, not taking anything for granted and introducing the various subjects in chronological order. Although the discussion is not focused on the history of the industry, its usage has been extremely important to give order and consistency to the entire work. Its natural intertwining with the history of Nintendo will give way to shed light on how innovation does not exist without managerial choices, and how these ones are always related to the surrounding industrial reality.

Acknowledgements

First of all, I thank professor Luigi Marengo, supervisor of this thesis, for having immediately trusted this work and allowed its realization.

I thank my parents, who have always supported me on this journey.

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0.1 Video games as a way to talk about innovation

From the beginning of its history, humanity has needed to play. "Game" has always taken on an educative and leisure function, fundamental for growth, development, and physical and intellectual satisfaction of every individual. In all ancient civilisations were discovered archaeological finds of toys and enigmas, as well as proofs of sports. No surprise if also in contemporary society "game" has been integrated perfectly in the system as "video game". It is one of most recent media, which has a prolific market nowadays. Its industry can boast a good diversification in its composition, starting to the primary decomposition between hardware and software sectors.

This work is dedicated to innovation, and video game industry is ideal to talk about it. Above all, evolution of technological paradigms is so essential that its history is split into "generations". Each one coincides with an improvement in hardware superior compared to previous generations. However, this paper will not take in consideration the usual technologic update, but four moments where there was an innovation that has led to relevant novelties.

In particular, the focus will always target one of the principal firms, Nintendo. Since early eighties, this company has always occupied a relevant position in video game field. The four developments that will be examined have been generated from decisions at corporate/business strategy level taken by the firm. Even if other companies have produced innovations in the sector, we will focus on Nintendo because it is the one that has provided the most significant contribution.

0.2 Objectives of thesis

This paper wants to achieve two objectives, one primary and one secondary.

The primary is to demonstrate that innovation has many forms and it can be applied in many ways. Often we think that the only real innovation is that of the product, but we forget other typologies. The dissertation of video game sector is the key to examine innovative processes in a wide range of possibilities. We will see it as product improvement, openness toward new segments of customers, or revolution in structure of industry itself. The goal is to understand not only its various forms but also why it never exists for its own sake. If there is innovation, there are also corporate objectives!

The secondary goal is to show how Nintendo managed to remain always active in video game field for about 40 years. Since it is entered in this sector, it was and it continues to be the only big firm to have its business strategy entirely focused on video games. Other firms instead count on differentiation of business portfolio. Although it had its times of crisis, it has managed to recover and to adapt in an industry that changes continuously in decades. So, it will also be an opportunity to talk about decisions taken at business strategy level and their effects, both positives and negatives.

0.3 An historiographical approach

It is not possible understanding innovation without comprehending the context where it appears. Changes are always generated by motivations and in Economy there are no exceptions. We will see events distant in time, that require each one an overview of industry's situation in every specific moment. Consequently, the author has decided to have a historiographical approach in the realisation of this paper. It will describe the history of video game from the beginning until present days. In this way, we can spot points of interest while we understand circumstances in a specific moment.

It is an approach to support the two goals, but it is not a complete description of industrial history. The most significant events will be highlighted, but they will be dealt in details only if it is necessary. Nevertheless, this means that some parts will be exclusively dedicated to its narration; therefore it will be described only the notable milestones.

0.4 Structure of work

This paper is divided into seven chapters.

Chapter 1 will provide base elements to understand the topic. It will talk about what “video game” mean, which is the history of Nintendo before its entry in video game market and what it has happened throughout the first two generations of the industry.

Chapter 2 will talk about the third generation and how Nintendo, with the first innovation, has revolutionised the industry.

Chapter 3 will debate about the fourth generation and the second innovation.

Chapter 4 will be exclusively dedicated to dissertation of fifth and sixth generation.

Chapter 5 will illustrate Nintendo's third innovation and about it has influenced the seventh and the first half of eighth generation.

Chapter 6 will debate about the second half of eighth generation, that is the current one, and the fourth innovation.

Finally, in Chapter 7 will draw the overall conclusions concerning the entire paper.

Chapter 1 – Beginning of video game industry

1.1 Tools to understand

In order to understand the first innovation, we need a certain degree of knowledge about how the video game industry works and what has happened in his first decade of life. So, this first chapter will focus on giving necessary indications about all the following ones. It will illustrate, also, essential tools for a correct interpretation of intrinsic mechanisms of industry and their implications.

We will begin explaining the definition of "video game" and understand how it works this particular industrial production nowadays. We will pass, then, to a brief description of Nintendo's history before its entering in the videogame's market. Finally, the chapter will cover the main events that occurred in first two generations, included the video game crash of 1983, fundamental to understand how the first innovation is significant.

1.2 Video game and its industry

1.2.1 What is a “video game”?

A "video game" is an electronic game in which players control images on a video screen.[1] We can split the process into three primary parts: input peripherals, processors and output peripherals.

Input peripherals are devices with which players interact with video games. There are various typologies, but we will refer to them as "controllers". Processors fulfil two functions: they run video games (that are, trivially, software) and interpret inputs to calculate outputs. They can be machines explicitly designed for this purpose – in that case they are called "video game consoles" - or they can be devices like PCs or smartphones. Output peripherals are video screens; video game consoles usually utilise TVs, or they can have an integrated screen.

[1] Merriam-Webster. *video game*. Retrieved 1 October 2019

1.2.2 Structure of the industry

The structure of the industry is changed over the decades. Now we will see the current composition; then we will talk about its history and we will understand all processes that have changed it over time.

First of all, video game industry is split into two fundamental parts: hardware and software. The former is dedicated to the development and commercialisation of video games' hardware (mainly processors), the latter to video games itself. Please note that this thesis will focus almost exclusively on the hardware industry for two reasons. The first one is that the software industry has always been, in every moment, a monopolistic competition. The second is that an analysis of a videogame in itself required other academic fields such as Programming, Electronic or Computer Engineering. Video games will be mentioned but as single products.

Hardware industry can be split into two main sub-sectors. The first develop video games consoles, that are further divided between home consoles and handheld consoles. The first ones require an electricity connection and an output peripherals (often a TV), the second ones are battery powered. The second sub-sector concerning development of PC's hardware, like processors or graphics cards, explicitly designed to run videogames. This sub-sector is called "PC Game" or "PC Gaming"[2].

It is useful also some sub-sectors that are currently market niches. First of all, there is the development of technologies correlates to virtual reality videogames, like *Oculus Quest*[3]. Then there are the hybrid consoles, able to works both with electricity connection and batteries. Lastly, the market of videogames in streaming that has very recently created with projects like *Google Stadia*[4]. They run videogames on hardware that are not owned by players, but utilise Internet connection to manage inputs and outputs. They are still in an initial phase, so it hard to say if there is the good change to be in front of the most significant innovation (if not a revolution) of the video game industry.

[2] Techopedia. *Personal Computer Game (PC Game)*. Retrieved 1 October 2019
[3] Oculus Official Site. *oculus.com*. Retrieved 1 October 2019
[4] Google Stadia Official Site. *stadia.google.com*. Retrieved 1 April 2020

1.3 A brief history of Nintendo

Nintendo Co., Ltd. (or just *Nintendo*, see its logo in figure 1)[5] is a Japanese firm with its HQ in Kyoto. Its name means literally "leave luck to heaven".[6] It was founded in 1889 by FusajiroYamauchi[7] and it produced *hanafuda*, the traditional Japanese playing cards. It was the only firm's business for nearly seventy years. Things changed in 1956 when Hiroshi Yamauchi, grandson of Fusajiro and third president of Nintendo, realized that playing card business had few chances to grow. Between 1963 and 1968 it tried to diversify in other areas of business, like TV network, taxi and food companies, but all of them were failures.[8]

Another diversification was entering in 1966 in the Japanese industry of toys with *Ultra Hand*[9]. Unlike the others, this new business had succeeded and the firm began to produce toys, but despite some successful product it struggled to keep pace with other companies in the sector. That is why in 1973 Nintendo produced *Laser Shooting System*, a light gun shooter that could be considered as its very first video game. Despite it, its official entry in the infant video game industry was the following year, 1974, but its presence would become relevant some year later.

[5] Nintendo Official Website. *www.nintendo.com*. Retrieved 1 October 2019
[6] staff.science.uva.nl. *Nintendo Corporation, Limited*. *staff.science.uva.nl*, via *Internet Archive*. Archived from the original on July 22, 2012. Retrieved 1 October 2019
[7] Kohler, Chris (September 23, 2010). *Sept. 23, 1889: Success Is in the Cards for Nintendo*. *Wired*. Retrieved 1 October 2019
[8] NDTV Correspondent (September 23, 2014). *As Nintendo Turns 125, 6 Things You May Not Know About This Gaming Giant*. *NDTV Gadgets*. Retrieved 1 October 2019
[9] Sheff, David. *Game Over: How Nintendo Conquered the World*. New York: Knopf Doubleday Publishing Group, 2011. Retrieved 1 October 2019

Figure 1 - Nintendo's logo[10]

1.4 First video game generation

1.4.1. When was video game industry born?

It is not simple to define when video game industry was born. The problem is that there are not unambiguous pieces of information about which was the very first video game ever made. We can find some examples starting from 1947, but no one of them is considered an actual video game. The oldest one universally recognised is *Noughts And Crosses* (also known as *OXO*), a tic-tac-toe simulator created in 1952 for an academic thesis[11]. However, the first one ideate only to have fun was *Tennis for Two* (1958)[12]. Nevertheless, we need to find the first video game created to be distributed if we want to talk about the industry. We need to learn about the very first typology ever appeared on markets: arcade video games.

[10] © Nintendo Co., Ltd.
[11] Winter, David. *Noughts and Crosses – The oldest graphical computer game*. *Pong Story*. Retrieved 1 October 2019
[12] They Create Worlds Staff (January 28, 2014). *Tennis Anyone?*. *Video Game Historian*. Retrieved 1 October 2019

Arcade video games are characterised by the use of a dedicated structure, with video screens and controllers integrated, for interactions with players. Settled mainly in amusement arcades (and contributing to their diffusion), they require the inserting of coins to be played. For example, *Periscope* (1966) required $0,25 every game.[13] It is not recognised as a video game but as an "electromechanical" arcade. However, it is mentioned as one of the very first products of Japanese company *Sega*, destined to be the main rival of Nintendo. In any case, the first arcade video game put on the market (in amusement arcades) was *Computer Space* (1971).[14]

1.4.2 1972: Atari and Magnavox Odyssey

Two events that occurred in USA in 1972 make this year the official one to indicate the born of video game industry. From this moment we will always refer to North American market if not differently specified.

In June 1972 Nolan Bushnell and Ted Dabney, creators of *Computer Space*, found *Atari, Inc*. It was the first firm created with the intention to produce video games, and also the first relevant company in this context. It is the firm associated with the first period of industry, that one included between 1972 and 1983. Its first commercial success was in November 1972 with the famous arcade video game *Pong*[15].

In September 1972 was launched on the market *Magnavox Odyssey* (figure 2), the first video game console ever sold[16] (from this moment we refer to them also as just "consoles"). With it, the first generation of consoles officially began. The main characteristics of consoles of that period, over to be the first ones ever created, lay to have all games within them. For example, let us examine *Magnavox Odyssey* itself: in its internal electronic circuits were programmed 12 games but in the package were included printed circuit boards. Plugged into one, they modified the internal circuitry, set them to a game. Other consoles had just one game, like for example *Atari Home Pong*, the home version of *Pong*[17].

[13] Next Generation staff (December 23, 1996). *Did you know that Sega was started by an American?*. *Next Generation* via *Internet Archive*. Archived on May 27, 2015. Retrieved 1 October 2019
[14] DeMaria, Rusel; Wilson, Johnny L.. *High Score!: The Illustrated History of Electronic Games*. New York: McGraw Hill/Osborne, 2002. Retrieved 1 October 2019
[15] Cohen, Scott. *Zap! The Rise and Fall of Atari*. New York: McGraw-Hill, 1984, via *Internet Archive*. Archived on November 23, 2011. Retrieved 1 October 2019
[16] DeMaria, Rusel; Wilson, Johnny L.. *High Score!: The Illustrated History of Electronic Games*, New York: McGraw Hill/Osborne, 2002. Retrieved 1 October 2019
[17] Fulton, Steve (November 6, 2007). *The History of Atari: 1971–1977*. *Gamasutra*, via *Internet Archive*. Archived from the original on September 23, 2019. Retrieved 1 October 2019

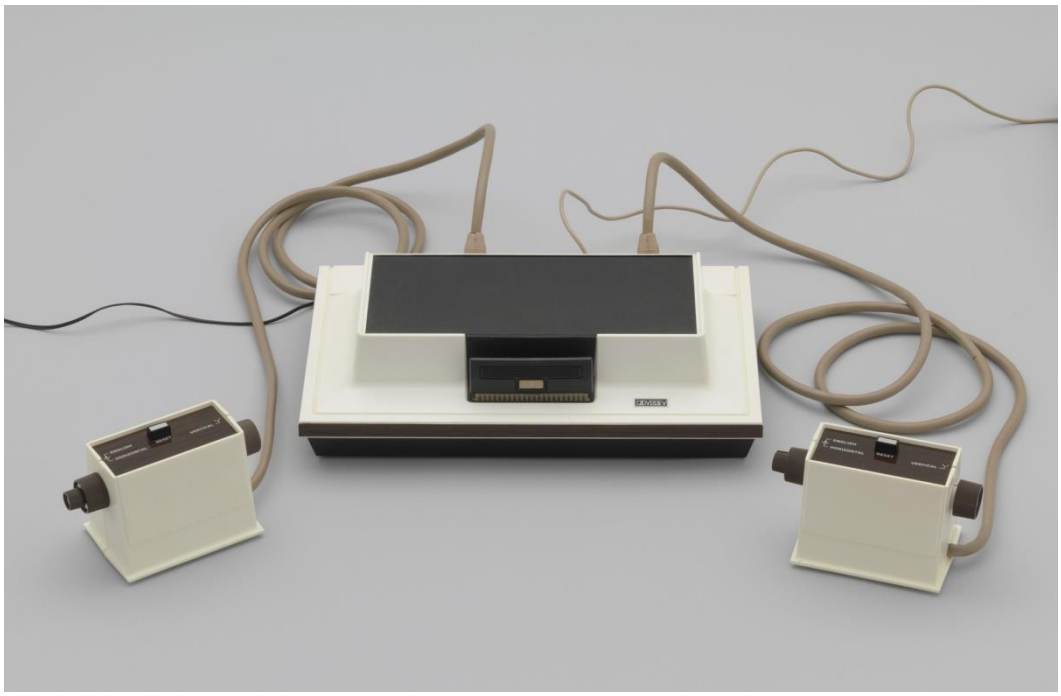

Figure 2 – Magnavox Odyssey

The reader maybe will be wondering why the history of the entire video game industry is split into generation. If they refer only to sector "hardware - video game console", why they are utilised as a measure of time? Because it is practical to divide industrial history into periods of 5-8 years. For example, if we analyse an industrial phenomenon, say that "it happened throughout the second generation" is more immediate than "it happened in 1979". We also have to consider that consoles have been the primary sector for about thirty years. The real protagonists, however, of the first period were arcade games, whereas consoles were in minority. Nevertheless, starting from the third generation they became more and more important, and only since '10s of 2000 their influence was questioned by the advent of new technologies.

1.4.3 What did Nintendo do?

Nintendo entered official in the industry in 1974 acquiring rights to distribute Magnavox Odyssey in Japan. In 1977 it released a series of consoles named *Color TV-Game* exclusively for Japanese market[18]. However, the most notable event was the hiring of Shigeru Miyamoto, that will have a crucial role in the development of the greatest successes of the firm, *Super Mario Bros.* included. Its influence will be so meaningful in video game industry, especially in software, that in 1996 will be equated to the one of Steven Spielberg in cinematographic industry [19].

[18] Crigger, Lara (March 6, 2007). *Searching for Gunpei Yokoi*. *The Escapist*. Retrieved 1 October 2019
[19] CBS. *Famous Names in Gaming*. *CBS News*, via *Internet Archive*. Archived from the original on May 11, 2013. Retrieved 1 October 2019

1.5 Second video game generation

1.5.1 ROM Cartridges and the separation between hardware and software

The passage from first to second console generation happened with *Fairchild Channel F* put on the market in January 1976, even if the most sold console was *Atari Video Computer System* (then renamed *Atari 2600*) produced by Atari and released in September 1977 (figure 3). The main innovation consisted in the ideation of ROM cartridges (from this moment we refer to them also as just "cartridges"). These one permit to not store data of a videogame in a console but instead in an external memory card. Because of this change, it began the division process between hardware and software markets.

Figure 3 – Atari 2600

At the beginning there were console production companies that produced also cartridges and videogames, like Atari. In 1979 four programmers quitted the firm, and on October they found *Activision* (still operating), the first company that was a third-party video games developer. This finished the process, creating two markets distinct but interconnected and mutually indispensable. In the following generations, console producers continued to self-producing video games, but starting from the fifth generation they begin to rely on mainly third-party developers. Nowadays only Nintendo continues do consistently produce its games.

1.5.2 Golden age of arcade video games

Market share of that period continued to remain mainly in the video game arcade sector. No surprise that the very first famous videogames appeared in this field, creating a golden age between 1978 and 1982. In 1978 appeared in amusement arcades *Space Invaders* (Taito[20]), considered as one the most influential videogames ever. It was a market success, even if the peak was reached in 1980 with *Pac-Man* (Namco, in figure 4 a screenshot). This game is one of the few videogames running for the title of "most well-known videogames ever". It has gone beyond amusement arcades' borders, entering in '80s pop culture and its iconic circular yellow shape is still nowadays instantly recognisable. Talking about sales, *Pacman* sold 400,000 units (to amusement arcades)[21], breaking *Space Invaders'* record (360,000)[22].

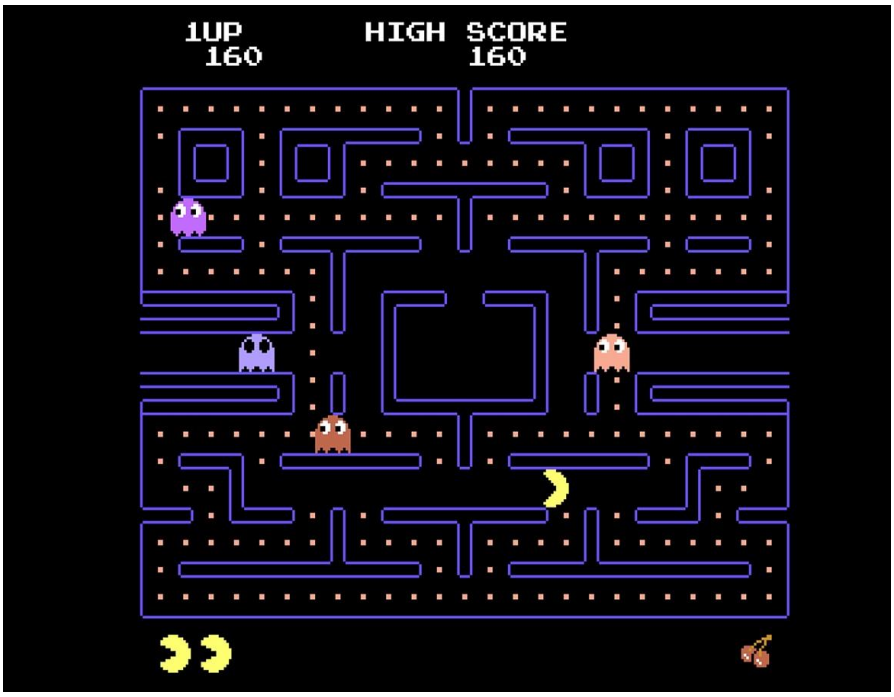

Figure 4 – Screenshot from "Pacman"

[20] From this point, every time a video game not developed by Nintendo is mentioned, its software house will be mentioned as well in parentheses.
[21] Kao, John J.. *Entrepreneurship, Creativity & Organization: Text, Cases & Readings*. Upper Sadle River: Prentice Hall., 1989. Retrieved 15 October 2019
[22] Jiji Gaho Sha, Inc.. *Asia-Pacific Perspectives, Japan Plus, Volume 1*. Jiji Gaho Sha, Inc., 2003. Retrieved 15 October 2019

1.5.3 What did Nintendo do?

In 1980, Nintendo launched in Japan a series of handheld consoles named *Game & Watch*, each one containing a game and a watch (hence the name). It was the very first commercial success of the firm. It was the second version of handheld consoles ever made (the first was Milton Bradley Company's *Microvision* in 1979[23]) but we cannot already talk about a division in industry, having been ideated mainly to be a pastime.

Its most important videogames of that period was an arcade video game: it was *Donkey Kong*, released in 1981, third in units sales (132,000 between Nord America and Japan).[24] [25] The game consisted of a series of level composed of platforms and stairs where the protagonist, a carpenter named Jumpman, had to reach the peak of them. Here it was situated Donkey Kong, a giant gorilla (clearly inspired by King Kong) that held hostage the protagonist's girlfriend. The player had to make its way among barrels launched by the gorilla and other enemies to end levels, attempting to obtain a high score.

This videogame has not been just a great success of Nintendo, but also the origin of *Super Mario* brand. Indeed, Mario's character derives from Jumpman: both of them have in "jump" the main feature. It is not a coincidence that *Donkey Kong* was ideated by Shigeru Miyamoto[26], the man that would later have created *Super Mario Bros*.

1.6 Video game crash of 1983

1.6.1 Turning point

We can say that the industrial history can be split before and after 1983. In the final step of this chapter, we will try to do a summarisation of the events that happened. Let us begin considering that "video game crash" is a term too much generic, a more suitable one is "North American consoles' video game crash". Indeed it was not a global difficult of the entire industry, but it was still very significant and it has heavily influenced it.

[23] Fans, Travis (July 28, 2009, updated January 14, 2012). *IGN Presents the History of Game Boy*. *IGN*. Retrieved 15 October 2019
[24] Ashcraft, Brian; Snow, Jean. *Arcade Mania!: The Turbo-charged World of Japan's Game Centers*. Bunkyō: Kodansha International. Retrieved 15 October 2019
[25] Bienaimé, Pierre (January 13, 2012). *Square Roots: Donkey Kong (NES)*. *Nintendojo*. Retrieved 15 October 2019
[26] See 1.4.3

1.6.2 1980-1983: causes

The leading causes of North American crash are basically three. The first was an overflow of console production. In 1980 there was five video game console in the market, but then in 1982 they had become nine. Why? Because in 1980 Atari acquired rights to create a console version of *Space Invaders*. It had a great success: it was the first videogame ever to sell over 1 million copies.[27]. Consequently, many producers tried to find success and began to produce console. The problem? From 1982 to 1983 the demand was increased by 100%, but the production by 175%[28], causing an excess of supply.

The second cause was the proliferation of third-party video games developers. In those years they increased to 15-30 (remember that in 1979 there was only one). The problem was not only the increasing, but also the fact that only Activision had experienced programmers in video games. Quoting directly its founder, David Crane:

"*(...) These companies failed to realize that making fun, compelling video games (...) is massively difficult. They had no game designers, but instead hired programmers from other fields. These companies all failed, but not until they had built 1-2 million copies of the worst games you can imagine. Those awful games flooded the market at huge discounts, and ruined the video game business."*[29]

Third and last cause, in those years was born the concept of "home computer". Atari itself in 1979 put on the market two versions, *Atari 400* and *800*. Other firms followed it, like *IBM*, *Sinclair Research* and *Commodore International*, the last one famous for its *Commodore 64* released in 1982. With home computer industry was being born the market of home computer video games. In that period they had more memory and faster processors than a console, so they resulted more attractive to developers and customers. To the first ones they guaranteed more sophisticated games and the possibility to distribute them with cassette tapes or floppy disks, to the second ones a lower price and other uses like writing programs.

[27] Weiss, Brett. *Classic home video games, 1972–1984: a complete reference guide*. Jefferson: McFarland, 2007. Retrieved 15 October 2019
[28] Kleinfield, N.R. (October 17, 1983). *Video Games Industry Comes Down To Earth*. *The New York Times*. Retrieved 15 October 2019
[29] Arcade Attack staff (May 9, 2016). *David Crane (Atari) - Interview*. *Arcade- Attack*. Retrieved 15 October 2019

Despite it, the infant industry of home computers was rapidly destroyed. Starting from 1982 firms began a price war that cancelled the competitive advantage with consoles. There was a decline in demand and in1983 only *Commodore 64* was widespread on a large scale. The conjunction with the console crash dissolved the industry in the same year, even if not entirely (for example *Apple Macintosh*, the first of *Mac* series, was marketed in 1984).

1.6.3 1983: the year of disaster

Due to the excess of supply, in 1982 the market was so saturated of video games that prices quickly quick prices dropped from an average of $35 to just $5.[30] Moreover, there was a sharp decline of the market share of cartridges produced by Atari, that passed from 75% in 1981 to less than 40% in 1982[31], because third-party video games developers also produced cartridges compatible with consoles. In 1983 the market was full of those *"worst games you can imagine"*. This caused a broad disinterest of customers for those very low-quality video games. Consequently, stores drastically decreased the number of video games on sales.

Starting from June 1983 there was a disaster. Many companies close their doors, included Atari, which had a very particular issue that year. In 1982 it produced many million copies of *E.T. the Extra-Terrestrial*, a video game inspired by the homonymous Spielberg's film. However, it is well-known as one of the most terrible games ever created. With other games, unsold cartridges (the majority) were buried near Alagamordo, New Mexico. This event, go down in history as "Atari video game burial", was so incredible that for decades it was considered just an urban legend, until 2012 when excavations were made to verify if actually there were some buried cartridges[32].

The firm had a crash and began a subsidiary of *Warner Communications*, and then it was split into sub-firms. In the next chapters will we discuss about one of them, *Atari Corporation*, the subsidiary that had the brand's rights. Nowadays exist *Atari, Inc*. but it is a subsidiary of *Atari, SA*. Previously known as *Infogrames Entertainment, SA*, it is the firm that acquired rights on the brand from *Hasbro Interactive* in 2001 (*Atari Corporation* sold its IPs in 1998[33]).

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[30] Prince, Suzan D.. *Faded Glory: The Decline, Fall and Possible Salvation of Home Video*. New York: Pumpkin Press, 1983, via *Internet Archive*. Archived on May 31, 2015. Retrieved 16 October 2019

[31] Rosenberg, Ron (December 11, 1982). *Competitors Claim Role in Warner Setback*. *Boston Globe Archive*, via *Internet Archive*. Archived from the original on November 7, 2012. Retrieved 16 October 2019

[32] Goldsmith, Alex (May 30, 2013). *Alamogordo approves Atari excavation*. *KRQE.com*, via *Internet Archive*. Archived from the original on May 30, 2013. Retrieved 16 October 2019

[33] Johnston, Chris (April 28, 2000). *Atari Goes to Hasbro*. *Gamespot*. Retrieved 1 April 2020

1.6.4 Why it was so relevant?

Although it was an industrial disaster, the 1983 crash was not so serious if we have a global vision. Why? Because it affected only console video games in a period in which arcade video games were relevant and also is concerned only the North American market without influencing the Japanese one.

So, why was it so relevant? Because it has generated the comprehension that the industry had to be managed in another way, especially with third-party developers. We have seen how the crash has been generated by an excess of supply and low quality games. Therefore, these two factors had to be eliminated.

The crash caused, also, a shifting of the core of video games console industry from America to Japan. It was not a coincidence considerate that in Japan were consoles dominant, not arcades. If in America in 1983 there was the crash, paradoxically in the same year in Japan it was released the console that would raise the industry again in five years. It was the time to change the management of video games business radically.

It was the time of Nintendo.

Chapter 2 – Reviving an industry

2.1 Turning point

In 1983 the market of console videogames in North America was in a deep crisis, but in 1988 it was overcoming arcade videogame in terms of diffusion. What happened in those years was the appearance of the third generation, that did more than simple technical updates. The mentality itself to approach industrial production changed radically and the chief merit goes to Nintendo. The reader will not be surprised learning that in this period the firm has become one of the industry's cornerstones, but how?

This chapter will describe the third generation and the role played by *Famicom*/*NES*, Nintendo's console of that period. We will focus on the decisions taken by the firm that has determined its success, especially in North America, and their implication on industry's future, generating one of the four innovations. The final part will describe the beginnings of Sega, the future main competitor of Nintendo.

2.2 Third video game generation

Videogame's third generation began in July 1983, when at the same time were released two consoles in Japanese market. One was Nintendo's *Family Computer*, commonly known as *Famicom*, the other one was Sega's *SG-1000*[34]. Both of them were subjected changes in names when they were exported. Outside Japan, the former was commercialised as *Nintendo Entertainment System* (*NES*), the latter, after some changes in design that have led to a new model called *Sega Mark III*, was renamed *Sega Master System*. Another console worthy of mention of that period is *Atari 7800*[35], released in 1986 by Atari Corporation (one of the firms created by Atari's split).

From a technical point of view, the third generation is known as the 8-bit generation, that is the nominal power of consoles. The main update, beyond a natural improving of graphic and sound, was the possibility to save game states on consoles, a characteristic before reserved only to PC games.

[34] Kent, Steven L. *The Ultimate History of Video Games: From Pong to Pokémon and Beyond*. New York: Three Rivers Press, 2001. Retrieved 8 January 2020

[35] Grand, Joe; Thornton, Frank; Yarusso, Albert; Baer, Ralph H.. *Game Console Hacking – Chapter 10: Atari 7800*. Rockland: Syngress Publishing, Inc., 2004, via *ScienceDirect*. Retrieved 8 January 2020

2.3 How NES conquered North America

2.3.1 Beginnings and exportation in USA

Famicom was released in Japan in July 1983, and after a period of poor sales (also due to technical problems) it began the most popular console in that country at the end of 1984[36]. It was at that time that Nintendo decided to export it in USA, but the task was anything but simple. After 1983's videogame crash consumers and retailers have lost trust in that market, so Nintendo had to make choices in order to sell its console.

The first was to make a change in the console's design. *Famicom* resembled too much to previous consoles, so Nintendo decided to modify it in order to give the appearance of video recorders, which were very popular in those years. Its name was changed in *Nintendo Entertainment System*, or just *NES* (this is the reason why this console is often referred to as *Famicom*/*NES*). In general, Nintendo's goal was to commercialise its console as something not correlated to videogames, a market considered by specialised American opinion as dead[37], but to toys.

The new version of the console was launched in 1985, and fundamental in the marketing campaign was the bundle with *R.O.B.*, acronym of *Robotic Operating Buddy* (figure 5). It was full-fledged one of the most sophisticated controller every created, disguised as a toy-robot, with two games included at the launch that utilised it. The reader maybe will be surprised discovering that these two games were the only two created, because it did not receive support from just 1986. Why? Because *R.O.B.* was a "Trojan Horse", a way to bypass the enormous mental barrier that was created in the minds of American consumers towards videogames[38]. *NES'* marketing campaign was focused on selling console and videogames as toys, and the bundle with *R.O.B.* (promoted as an interactive robot) was the key of console's success in North-America.

[36] Kent, Steven L. *The Ultimate History of Video Games: From Pong to Pokémon and Beyond*. New York: Three Rivers Press, 2001. Retrieved 17 January 2020

[37] Wilson, Johnny L. *The History of Computer Games*. Computer Gaming World. Anaheim Hills: Golden Empire Publications, 1991, via *Computer Gaming World Museum*. Retrieved 17 January 2020

[38] GameSpy Staff (July 21-25, 2003). *25 Smartest Moments in Gaming*. *GameSpy.com*, via *Internet Archive*. Archived from the original on June 12, 2007. Retrieved 17 January 2020

Figure 5 – An advertisement of NES (from left to right: R.O.B., a couple of cartridges, NES Zapper[39], NES and its controllers)[40]

In 1985, *NES* appeared as a crazy project doomed to failure, but at the beginnings of 1986 the first experiment of bundling with *R.O.B.*, circumscribed only to New York City, was a sensational success, and in the same year the console was launched in other cities and then in all national territory. In 1987 was the dominant console in North American market and in 1988, just five years after 1983's crash, one in three American citizens owned one[41]. However, we have not to think that its success was determined only by a change in design or a marketing campaign: their purpose was only to surpass the cultural barrier. The real point is that Nintendo had understood that consumers were not tired of video games, but of pre-1983 bad video games.

Therefore, we have to investigate more in-depth about how Nintendo had managed to resolve the severe problems that afflicted the market in 1983. In their resolution there is the key to understand the first innovation, destined to change industry's modus operandi. Indeed, that innovation is not made by a revolutionary product or a particular change in the creation of videogames, but in the profound modification of the relationships between console producers and software houses.

[39] An accessory for Famicom/NES released in Japan in 1984 and in North-America in 1985
[40] © SCES TRADING LTD
[41] Keiser, Gregg. *One Million Sold in One Day*. Compute!. New York: American Broadcasting Company, 1998, via *Internet Archive*. Archived from the original on August 24, 2011. Retrieved 17 January 2020

2.3.2 Change in relationships with software houses

"Atari collapsed because they gave too much freedom to third-party developers and the market was swamped with rubbish games"[42]

This words spoken in 1986 by president Hiroshi Yamauchi explain clearly that Nintendo had in mind what was the main problem that had created 1983's crisis. How to solve it? First of all, we have to remember that the crisis was actually caused by two problems! The first was that console producers, especially Atari, had no control over the production of cartridges. Therefore, every software house could develop and release its game without any supervision. The second was that in the second generation only Activision was a software house with a team composed of specialised developers. This had led to not specialised teams that have generated that infinity of terrible games - and consequentially the crash.

The control over cartridges was solved straightforwardly: only Nintendo could produce it. The real problem was to ensure that only original cartridges become recognised by consoles. For this purpose, it was inserted a lockout chip in consoles named *10NES*. Every cartridge produced by Nintendo had inside it a chip that was recognised by *10NES* and without that identification consoles would not run the game. That chip also had another function. It was the regional lockout: many version of the same chip existed, depending in which region of the world consoles were sold. Only cartridges with a compatible chip were recognised. This practice to create many versions of the same game depending on the region it was widespread in videogames world and only recently it was abandoned.

Solved the problem of cartridges, it remained the management of software houses. Nintendo created a contract in which every software house that wanted to produce games for *NES* had to produce exclusively for the firm and with a maximum of five games per year. Furthermore, for every game it had to order the production of at least 10.000 cartridges, cover the costs and take the risk to pay unsold inventories[43]. This course of action had not been without criticism, because the firm was sue for antitrust by the Federal Trade Commission, that force it to make changes to contracts[44].

[42] Takiff, Jonathan (June 20, 1986). *Video Games Gain In Japan, Are Due For Assault On U.S*. *The Vindicator*, via *Google News Archive*. Retrieved 17 January 2020
[43] Sheff, David. *Game Over: How Nintendo Conquered the World*. New York: Knopf Doubleday Publishing Group, 2011. Retrieved 17 January 2020
[44] GameSpy Staff (June 9-13, 2003). *The 25 Dumbest Moments in Gaming*. *GameSpy.com*, via *Internet Archive*. Archived from the original on March 20, 2008. Retrieved 17 January 2020

Finally, every package had the *Nintendo Seal of Quality*, that guaranteed how games were original and approved by the firm. In this way, consumers were reassured that they were quality games, in a period in which Nintendo was differentiating itself as creator and seller of videogames far better than the ones pre-1983. Since then, that seal is still utilised in all products of the company.

How this contract contributed to the increase of quality in videogames? Let us try to see it from the point of view of software houses. In order to produce for *NES*, the most sold console in North America, they were restricted in the number of games to create and take the risk to pay unsold inventories. So, their goal was to produce videogames capable of selling and at the same time to be at least considered to be in line with Nintendo (that was creating games too, as we will see soon). In summary, it was convenient to produce fewer games but with higher quality rather than a lot of bad games. This fact is the main result of the first innovation and later in the chapter we will discover why it is so important.

2.3.3 Most influential games

In order to make *NES* (and *Famicom*) as a quality console, Nintendo was on the front line in production of games that followed its standards. The most famous example is, without a doubt, *Super Mario Bros*., released in 1985[45] (in figure 6 a screenshot). Born as the sequel of *Mario Bros*. (1984), an arcade videogame, is recognised as one of the most influential games ever made. It also one of the bestsellers in videogame industry, that has sold almost 50 millions of copies of which 40 million only for *Famicom*/*NES* version[46]. In the game the protagonist, a plumber called Mario (derived from Jumpman of *Donkey Kong*) has to finish thirty-two levels split into eight worlds to save Princess Peach from Bowser, a sort of enormous anthropomorphic tortoise/dinosaur. It was the first game of Super Mario's franchise, one of the most profitable in videogames world. Noteworthy in that period was also one of its sequels, *Super Mario Bros. 3* (1988).

[45] Dates are always referred to the first release. The reader has to consider that Japanese games, if exported, were released one/two year after their original release in American market

[46] Stuart, Keith (September 13, 2010). *Super Mario Bros: 25 Mario facts for the 25th anniversary*. *The Guardian*. Retrieved 17 January 2020

Figure 6 – A screenshot from "Super Mario Bros."[47]

Other two games produced by Nintendo in those years were *The Legend of Zelda* (1986) (that together with *Super Mario Bros*. were developed by Shigeru Miyamoto) and *Metroid* (1986). These three games were the flagship products that drive to purchase *NES* because they were the "true" games beyond *R.O.B.*. It was, as mentioned above, just a marketing "Trojan Horse" for the first period, but then consoles were sold driven by videogames when the mental barrier was surpassed.

Not only Nintendo began with the production of quality games, but a complete list of them would be very long. Although it, worthy of mention are *Castlevania* (Konami, 1986), *Dragon Quest* (Enix, 1986), *Final Fantasy* (Square, 1987) and *Mega Man* (Capcom, 1987). Together with the three games mentioned above, all seven were the beginnings of franchises that still exist nowadays at a distance of over 30 years.

There is no surprise that still existed software houses after 1983's crash. Those who disappeared were American, not Japanese, and some of them (like Activision) survived by producing for the market of PC games.

[47] © Nintendo Co., Ltd.

2.4 Why had Nintendo succeeded?

With the historical description of events, it is necessary an in-depth analysis that goes beyond historical background to enter in a broader perspective. Therefore, in every chapter that explains one of the innovations there will be a section to examine in details how events around it were managed. In particular, analyses will examine the innovation in itself, its impact at the industrial level and how Nintendo's managerial decisions have contributed (both positively and negatively) in its application.

2.4.1 An excellent marketing campaign

More than a single innovation, the success of *NES* was due to a series of changes. It is necessary to specify that *Famicom* and *NES* were two separate products, even if they use same cartridges. *Famicom* has kept a design similar to second generation's consoles, it had not a lockout chip and it was commercialised in a market when videogame console sold more than arcades. On the contrary, *NES* has overcome more than one adversity and had to win the mentality of American consumers.

The change of console's design was a marketing choice to position it as distant as possible from the concept of "videogame". A paradoxical choice but more than justified in that period! An even more apparently paradoxical was *R.O.B.*, a controller disguised as a toy. The reader as to consider that *NES* was later exported in other countries, but without the necessity of *R.O.B.* to sell it. Its success in the American market shows how sometimes the problem is not in products, but in the way they are perceived by consumers.

However, an excellent marketing campaign would not have been sufficient alone. Crucial was the change in the approach that Nintendo established with the software market, the real problem of the second generation.

2.4.2 The importance of the first innovation

Why was the change in Nintendo's approach so important? To understand it, we have to consider the history of industry in its entirety. Without a doubt, the crash of 1983 was the ultimate evidence that giving excessive freedom to software houses leads to inauspicious consequences. So, Nintendo was justified when it created strict contractual rules to use with software houses. Furthermore, the firm itself was in the front line to delineate a precise idea of "quality in videogames". It is not a coincidence that the first videogame franchises were born in that period, and that trend would not have been an isolated boom in the third generation.

As we will see in successive chapters, the third generation has set a whole new standard in videogames, especially in software markets. Consumers wanted funny games, Nintendo dominated both in Japan and North America, and especially in the latter market software houses had to do everything possible to ensure to sell their games. At that point, the arrival of new generations meant more powerful hardware and so the possibility to create videogames even better. Already from the fourth generation, Nintendo no longer needed to use that contract: the market worked alone with the new standards.

Nowadays, the videogame software market is similar to the ones of films or books: there is a wide variety of genres, we can find masterpieces and product destined to oblivion, even remakes or reboots of old games. Many videogame franchises go beyond videogames themselves and have revenues selling linked gadgets. Many are the factors that have led to this situation, but fundamental is the fact that videogame has established itself as a medium of entertainment. The beginnings of all this process was in the decisions that Nintendo took in North American in the eighties. For this reason the first innovation, the change in relationship with software houses, is the most important: it has not just renewed a market that exited from a crash, but it has revolutionised the mentality of an entire industry.

2.4.3 Openness helps

From a managerial point of view, was *NES* a risky move? Surely it was not the safest road to take. Proposing just after two a year a product so profoundly in crisis was a hazard. The prudence taken in 1985 in selling *NES*, circumscribed at the beginnings to just one city, tells that it was not simple to know how to proceed. However, every decision taken was exact, moved by the intuition that it was only necessary to surpass a mental barrier and do not revive an entire market. *R.O.B.* was indeed a marketing's stroke of genius and played a crucial role in the process.

At the same time, Nintendo understood how the support of third-party developers was necessary to promote its console. Whereas other firms opened to them lately, the company took immediate advantage of software houses' collaboration. However, it was aware that it had not to give too much freedom, so it created a very severe contract. We have also to remember that Nintendo itself had talents in the creation of videogames. Therefore, this explains how *NES* (and *Famicom*) had so many successful games.

Although it had not taken wrong decisions overall, the tactic of strict policies was not without some consequences. In the short period it was sued for anti-trust and the provision to produce only for Nintendo did not make software houses happy. This caused, in the long period, that they preferred console with less severe rules, forcing the company to focus on self-produced games.

2.5 First steps of Sega

Nintendo was the leading firm that had revived videogames, but it was not the only one to operate in the hardware sector. For example, Atari Corporation attempted to reanimate the Atari brand with *Atari 7800* in North-America, but it had to deal with the total control of Nintendo. Moreover, *NES*' strict rules about developers forced Atari to focus on conversion of arcade games, that were popular but old. However, if the Atari brand was doomed to decline, another firm was emerging. That firm was Sega.

Sega Corporation (or just *Sega*, subsidiary of *Sega Sammy Holdings Inc*., in figure 7 its official logo)[48] was founded in Japan in 1960 by two United States citizens, Martin Bromley and Richard Stewart[49]. Its first name was *Nihon Goraku Bussan*, but in 1965 it changed in *Sega Enterprises, Ltd* (the first mentioned is its current name). In its early years of business, the company contributed to the birth of arcade videogames. In 1966 it created *Periscope*, mentioned in the last chapter, then it was one of the principal firms throughout the golden age of arcade videogame.[50]. The famous 1981 videogame *Frogger*, developed by Konami, was distributed by Sega.

Figure 7 – Sega's logo[51]

[48] Sega Official Website. *www.sega.com*. Retrieved 21 January 2020
[49] Horowitz, Ken. *The Sega Arcade Revolution, A History in 62 Games*. Jefferson: McFarland, 2018. Retrieved 21 January 2020
[50] Brandt, Richard; Gross, Neil (February 21, 1994). *Sega!*. *Bloomberg*. Retrieved 21 January 2020
[51] © SEGA Holdings Co., Ltd.

In 1982 the golden age finished, and the company was forced to sell its manufacture and licences of arcade videogames in North America[52]. In 1983 the new president Hayao Nakamura decided to try the business of Japanese videogame consoles. In the same year, simultaneously with *Famicom*, released *SG-1000*. Progressively, there were various change in design that ended in 1985 with the release of *Sega Mark III*. However, for the exportation in the American market in 1986 the firm decided for a further improvement, creating *Sega Master System*. The success of Nintendo both in Japan and American prompted to target European and Brazilian markets, respectively in 1987 and 1989, in which it sold more than *NES*. Like Atari Corporation, also Sega suffered the restrictive policies of Nintendo and it was forced to focus on self-produced games. Its flagship character was Alex Kidd, famous especially for the 1986 videogame *Alex Kidd in Miracle World*.

Although its actions in the third generation were not particularly remarkable, Sega has contributed to the diffusion of videogames on a global scale. In contrast, in the second generation the two principal markets were North America and Japan. Furthermore, his entrance in console's world was preparing the ground for the fourth generation and its rise as the main competitor of Nintendo.

2.6 Conclusions

The third generation was without any doubt a turning point for the whole videogame industry, especially for the home console sector. Nintendo was able to complete a not easy task: changing the mentality of American consumers about videogames. As a result, it became the leader in the sector. Its first-year marketing campaign, its policies adopted towards third party developers and its games have mainly contributed reviving a market that appeared to be dead. Besides, these actions damaged its competitors, with the Atari brand in decline and Sega force to move into less profitable regions.

The first innovation, that overall was the "change in mentality", had marked a new path, and Nintendo was the first ready to go that way.

[52] Pollack, Andrew (October 24, 1982). *What's New In Video Games; Taking the Zing Out of the Arcade Boom*. *The New York Times*. Retrieved 21 January 2020

Chapter 3 – Birth of handheld consoles

3.1 Introduction

3.1.1 Industry has stabilised

After the unsteady years of the third generation, video game industry had stabilised again. Thanks mainly to Nintendo (and partly also to Sega) the market in North America was back flourishing. Also, regions like Europe or Australia were starting to have the first sales of console and videogames. The fourth generation was, from this point of view, just a confirmation of how industry had found a new road to take.

However, it is in the fourth generation that happened the split inside the hardware sector. So far, we have always referred to video game consoles just as "consoles" because there was no necessity to make a distinction. From now, we will distinguish between "home consoles" and "handheld consoles". These last are the second innovation of which we will discuss in this chapter. After a description of the main events in other sectors, the speech will shift on the new segment of handheld consoles and how Nintendo has had an important role.

3.1.2 Clarification about data

Starting from this chapter data will be utilised to show sales volume in generations. However, it is necessary to specify that they are not data that can exhibit pieces of information like market concentration or revenues. Why there is this lack? Because find them is very difficult if not impossible.

Two are the motivations. The first is that it is not possible to find annual reports of the firms examined date back before the new millennium. Third parties' studies often are the primary sources of industry sales volume for that years, but they are always conducted when the generation examined is finished. Let us take an example with two fictitious consoles, "Alpha" and "Beta". If data report that Alpha sold 70 million units and Beta 30, these numbers include all the production from the beginning to official discontinues. If we compare sales data, it does not mean that Alpha had 70% of market share and Beta the other 30%, but only that Alpha, in the end, sold more than Beta. This lead to the second motivation: these data are often not comparable. For example, the pieces of information about Alpha can be gathered by a study conducted in 2012, whereas on Beta there are official sales data gathered in year 2009. Furthermore, market concentration and revenues require a lot of specific data, especially split among regions and versions of the same console, but often are grouped.

Therefore, sales figures give a rough estimation of trends in a generation, but they cannot be utilised to precisely illustrate market balances. Nevertheless, they show with sufficient precision which consoles have been successful and which have failed.

3.2 Fourth video game generation

3.2.1 Sega becomes protagonist

The fourth generation officially started in October 1987 with NEC Home Electronics's *TurboGrafx-16*[53] (also known as *PC Engine*). However, the two relevant home consoles of that period were Sega's *Mega Drive* (known in North America as *Sega Genesis* or just *Genesis*) and Nintendo's *Super Nintendo Entertainment System* (or just *Super NES* or *SNES*). Due to the increase of nominal power, this generation is known as the 16-bit generation.

Mega Drive was launched in Japan in October 1988, but in that country it did not stay the competition of *Famicom*, *Super NES* (released in 1990 in Japan as *Super Famicom*) and *PC Engine*. In 1989 it was launched in North America with the name of *Sega Genesis*, than in Europe in 1990 (as *Mega Drive*). The marketing campaign in U.S.A. became famous because it was very aggressive and focused on showing the console as performing and cool to young peoples. Remarkable is the advertising slogan of that period: "*Sega Genesis does what Nintendon't*"[54].

That process culminated in 1991 with the release of *Sonic the Hedgehog* (in figure 8 a screenshot). In the game, the homonymous protagonist goes through levels at high speed, its main trait. This with the primary purpose to demonstrate *Genesis*' computing power and at the same time to create a character capable to compete against Mario. The goal was achieved: not just that game was *Genesis*' killer application – that is a game that alone drives to purchase the console - but since then is the flagship character of Sega.

[53] PC-Engine Official Site. *PC-Engine*. *Pc-engine.co.uk*. Retrieved 10 February 2020
[54] Fahs, Travis (April 21, 2009, updated June 14, 2012). *IGN Presents the History of Sega*. *IGN*. Retrieved 10 February 2020

Figure 8 – A screenshot from "Sonic the Hedgehog"[55]

So, what happened when *SNES* was released in U.S.A. in 1991? It happened the first "console war", a term utilised in industrial jargon when two or more consoles are at trade war each other[56]. Sony had become full-fledged the main competitor of Nintendo, even if it is not clear who has won the war - in other words, who has sold more units - in North America. A study on the matter in 2004 indicates *Sega Genesis* as the winner, indicating that in percentage terms it has always sold more than *SNES* in every year of their life cycles[57]. However, a revision of that study in 2014 instead indicates the latter as the winner, with 20 million units sold, whereas the former sold 18.5[58]. We can conclude that the "console war" finished substantially in a draw.

The fourth generation is also known for add-ons, peripheral devices that have to be connected with consoles in order to increase nominal power and chiefly to take advantage of CD-ROMs' advent. Examples are *Sega CD* for *Genesis* and a never completed project for *SNES* (that became the initial concept of Sony's *PlayStation*, as we will see in the next chapter).

[55] © SEGA Holdings Co., Ltd
[56] Minor, Jordan (November 11, 2013). *Console Wars: A History of Violence*. *PCMag.com*. Retrieved 10 February 2020
[57] Clements, Matthew T.; Ohashi, Hiroshi (October, 2004). *Indirect Network Effects and the Product Cycle: Video Games in the U.S., 1994–2002*. *NET Institute*. Retrieved 10 February 2020
[58] Pachter, Michael; McKay, Nick; Citrin, Nick (February 11, 2014). *Post Hoc Ergo Propter Hoc; Why the Next Generation Will Be as Big as Ever*. *Wedbush Equity Research*, via *Internet Archive*. Archived from the original on March 4, 2016. Retrieved 10 February 2020

3.2.2 Arcade and PC games

During the last chapter, we have omitted arcade and PC games markets from the dissertation. The reason is that both have had little influence in industry's dynamics. Arcades ended their golden age in 1982 and since then they have become more and more a specific niche of the market. Nevertheless, some games have become very popular and have influenced console markets. For example, is in the period of fourth generation that it was released *Mortal Kombat* (1992), first of a series known for its extreme violence. This fact led the conversion for *SNES* to be censored by Nintendo whereas *Genesis*' version was not censored. However, Sega instituted one of the first video game rating systems, the *Videogame Rating Council*.[59].

Regarding PC games market, it was slowly coming back with PCs. In 1989 a game for that market drew attention. It was *SimCity*, first of the homonymous series. In the game, players have the task to create and develop cities as mayors. Its atypicality led it to become one of the first known to the general public and it is considered not just the precursor of urban simulators but also as the first example of an educational video game.

3.3 Beginnings of handheld consoles

3.3.1 A new sector

The history of handheld consoles is a parallel story to that of home consoles. Although manufacturer houses usually create ways to make them interact with each other, for example with communication devices, in practice the two typologies follow separate roads. The second innovation of which we will talk about is their creation, in which Nintendo has carried out an essential role in the process.

We have seen in the first chapter that the firm is among the creators of handheld consoles due to *Game & Watch*. However, it has been specified that it was too early to talk about a new segment because they had been designed mainly to be a pastime[60]. Nevertheless, Nintendo is still the creator of this segment in the modern sense, because the fourth generation's first handheld console released is its *Game Boy*.

[59] Foerstel, Herbert N.. *Free Expression and Censorship in America: An Encyclopedia*. Westport: Greenwood Press, 1997. Retrieved 16 February 2020

[60] See Chapter 1.5.3

3.3.2 How Game Boy defeated its competitors

Born from an idea of Gunpei Yokoi, the same designer and creator of *Game & Watch*, *Game Boy* (figure 9) was released in Japan in April 1989 and then in North America in the same year in July[61]. Over the next two years, three other consoles followed it: *Atari Lynx*, created by Atari Corporation, Sega's *Game Gear* and NEC's *TurboExpress*.

Figure 9 – Game Boy and a couple of its cartridges

At first glance, *Game Boy* was less attractive compared to its competitors. For example, its video display was monochrome with four shades of olive green, whereas the other three consoles had variegated palette colours. Also, its hardware performances were lower. However, if *Game Gear* sold 11 million units, *Turbo Express* 1,5 million and *Atari Lynx* just barely 500,000,[62] *Game Boy* (along with *Game Boy Color*, a following version that we will discuss later) sold nearly 120 million units[63]. How was it possible? In contrast to *NES*, that had taken also advantage to be the only one who tried in the North American market, in this generation Nintendo had three competitors. Furthermore, not only it was a new market also for the firm, but besides *Game Gear* was designed to oppose *Game Boy*.

[61] Fans, Travis (July 28, 2009, updated January 14, 2012). *IGN Presents the History of Game Boy*. *IGN*. Retrieved 12 February 2020
[62] Blake Snow (July 30, 2007). *The 10 Worst-Selling Handhelds of All Time*. *GamePro.com*, via *Internet Archive*. Archived from the original on July 30, 2008. Retrieved 12 February 2020
[63] Nintendo Co., Ltd. (March 3, 2016).*Consolidated Sales Transition by Region*. *Nintendo Co., Ltd.*, via *Internet Archive*. Archived from the original on April 27, 2016. Retrieved 12 February 2020

In this case we cannot talk about some other marketing strikes of genius, but just about some intuition about the product. We can identify three primary motivation in its success. The first lay in its price, lower than its competitors, since less powerful hardware also implied lower costs. If the other console had a price range (in the North American market) between US$150 and US$300[64], *Game Boy* was lower than US$90[65].

The second, probably the most important, was the battery life. We have already discussed that competitors had more powerful hardware and colour video displays, but these features imply a higher battery consumption. It can easily be understood that the focal point of handheld consoles is the possibility to take them anywhere without being limited by power plugs. While the other consoles had a battery life in a range of two-six hours, *Game Boy*'s one lasted about forty hours. Therefore, the ostensible hardware weaknesses of Nintendo's console turned into its strengths!

The third lay in a particular game, but oddly it was not developed by Nintendo. *Game Boy* could count on successful proprietary games like *Super Mario Land* (1989), its sequel *Super Mario Land 2: Six Golden Coins* (1992) or *The Legend of Zelda: Link's Awakening* (1993). However, the launching killer application was a famous soviet game developed in 1984: *Tetris*. The game consists of arranging in rows falling blocks to score points. Why was it the trump card? The intuition was that if usual Nintendo's games targeted a specific audience, *Tetris* could target a broader clientele that otherwise would not have considered purchasing a video game console.[66]. The insight was correct, and the bundle console-*Tetris* was one of *Game Boy*'s greatest successes[67].

[64] Melanson, Donald (March 3, 2006). *A Brief History of Handheld Video Games*. *Engadget*. Retrieved 12 February 2020
[65] Douglas C. McGill (June 5, 1989). *Now, Video Game Players Can Take Show on the Road*. *The New York Times*. Retrieved 12 February 2020
[66] Fans, Travis (July 28, 2009, updated January 14, 2012). *IGN Presents the History of Game Boy*. *IGN*. Retrieved 13 February 2020
[67] ELSPA staff. *ELSPA Sales Awards: Platinum*. *Entertainment and Leisure Software Publishers Association*, via *Internet Archive*. Archived from the original on May 15, 2009. Retrieved 12 February 2020

3.3.3 1996: Game Boy strikes back

Unlike what the lector might expect, *Game Boy*'s end did not arrive with the new generation. It had a second life and for the sake of the discussion we will fast forward a little bit, talking about the console during the fifth generation. In 1996 *Game Boy* was at the end of its life cycle, but there was a game that revitalised it. That game was *Pocket Monster*, commonly known as *Pokémon*. Born from an idea of Satoshi Tajiri, the project drew Nintendo's attention so much that it gave assistance to Game Freak Inc. - the development team - and even Shigeru Miyamoto itself was involved. In the game, the player has to catch and train some creatures named Pokémon to proceed and complete it. It was released in Japan in February 1996, two years later in North America and finally in Europe in 1999.

Why was this game the rebirth of *Game Boy*? It was not only for its enormous popularity - it sold worldwide about 31 million cartridges,[68] perhaps overcoming even *Tetris* - but also for a distinctive peculiarity. From an idea of Miyamoto, it existed many version of the same game. For example, three were the Japanese versions (*Red*, *Green* and *Blue*), whereas two were the international ones (*Red* and *Blue*, in figure 10 a screenshot from *Pokémon Red*). This split permitted to some Pokémon to be exclusive to one version, and so to be not included in the other ones. Therefore, to collect all of them, players were forced to exchange Pokémon each other through *Game Link Cable*, a communication device. In order to permit an exchange two *Game Boys* were necessary, so players were driven to buy one (rather than, for example, borrow it).

[68] Statista staff (November, 2019). *Best-selling Pokemon video games worldwide as of November 2019, by units sold (in millions)*. *Statista*. Retrieved 12 February 2020

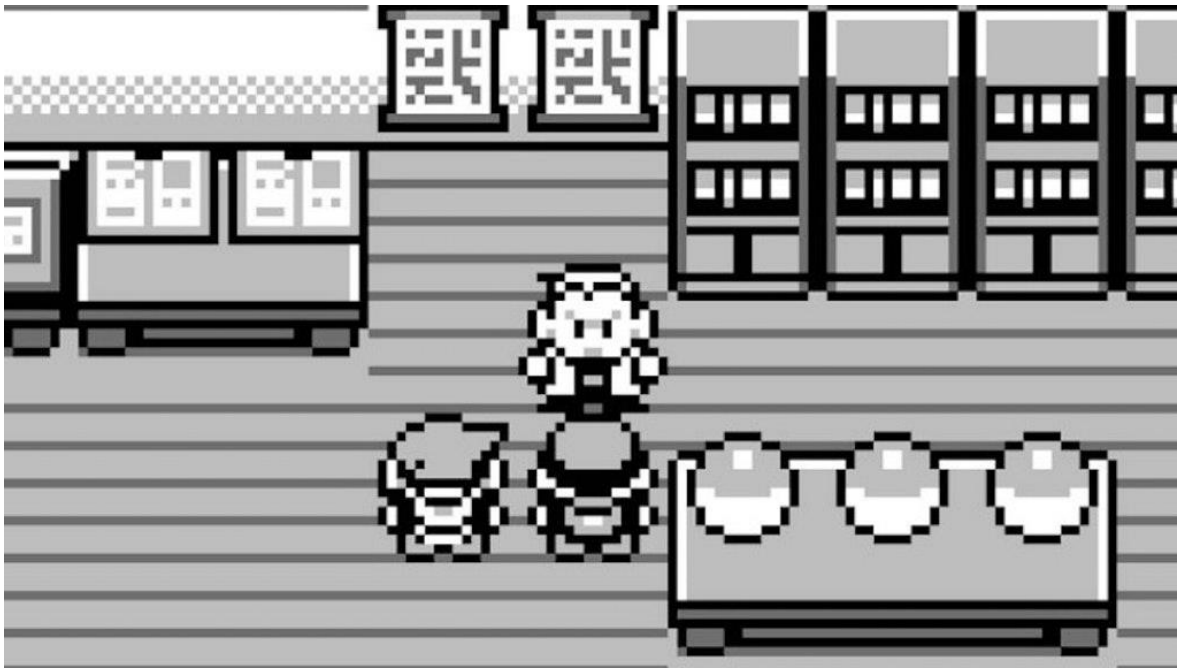

Figure 10 – A screenshot from "Pokémon Red"[69]

The console's second life convinced Nintendo to release in 1998 a new console: *Game Boy Color*. Although it was theoretically *Game Boy*'s successor, with its exclusive games, in practice the new features were just a little more powerful hardware and a colour display. So it is generally considered as just a better version of *Game Boy*, to the point that the two consoles are generally mentioned together in market analyses. If we consider only *Game Boy Color*'s data, the most successful games was the second generation of Pokémon, *Gold* and *Silver* (Game Freak Inc., 1999), with about 23 million cartridges sold. [70]

3.4 Why was Game Boy so successful?

3.4.1 When less power means success

Handheld consoles are innovative because they are a different way to approach videogames. If a home console requires television and a power plug, a handheld one requires only some charged batteries and it can be carried everywhere. It is a product innovation that has led to the birth of a new segment. Considering that *Game Boy* was not the only handheld console in that period, why we consider Nintendo as the leading creator? There are two motivations. The former is chronological, since *Game Boy* was the first to be released, the latter is commercial, because its extraordinary success that has overshadowed its competitors.

[69] © Nintendo Co., Ltd../Creatures Inc./GAME FREAK Inc.
[70] Statista staff (November, 2019). *Best-selling Pokemon video games worldwide as of November 2019, by units sold (in millions)*. *Statista*. Retrieved 12 February 2020

Why was it such a success? Among the reasons explained above, we have to focus on the competitors' fundamental problem: battery consumption. Their attention was not focused on the fact that home consoles have not the problem of electrical energy consumption. Indeed, all competitors had excessive energy absorption as a common problem, that led to a weak autonomy of the battery that did not exceed six hours, whereas *Game Boy* reached forty hours. In other words, in a handheld console is important a right balance between performance and energy consumption. Hard to tell if Nintendo's engineers had intuited this rule or it is was just a consequence of having designed a low power console. In any case, this also led to being able to sell the console at a lower price, another critical factor in its success.

Can then an innovation be considered as such if it was the worst from a technical point of view? Undoubtedly, because it does not count only the novelty itself, but also its saleability. The success of *Game Boy* (and of *Game Boy Color*) was so big that is the third best-selling console in the video game industry[71]. Furthermore, if we consider the energy absorption problem, can we truly affirm that the console had awful hardware? Whatever the answer, we can negate that it was *Game Boy* who created the new segment, so we can conclude that it was a full-fledged innovation.

3.4.2 The realm of Nintendo

How *Game Boy* contributes to the industry? It created a new sector, the one of handheld console. A sector with so much potential that in just two years there were four consoles. If we consider the totality, how this new field has influenced the whole industry? As we will especially see in the last generations, home consoles will develop the tendency to compete in the power of hardware, due to both competition among companies and the reborn of PC market. Inherently, handheld consoles have always been considerably less potent than their house counterparts, staying focused on their internal competition.

A competition that actually has rarely taken place, since Nintendo always has been dominant in that sub-industry. Why? The answer lies in company policies rather than industrial dynamics. We have to remember that the company have both hardware and software divisions. Consequently, in consoles' design phases it have always reasoned in the creation of videogames that could take full advantage of their technical characteristics. To this we must add that Nintendo has control over profitable IPs like Mario, Zelda or Pokémon. The result is that the firm is the *de facto* monopolist of handheld consoles.

[71] Sirani, Jordan (October 30, 2019, updated January 30, 2020). *Where Switch, PS4 Rank Among the Best-Selling Video Game Consoles of All Time*. *IGN*. Retrieved 12 February 2020

This had brought benefit to the company at any time, even when home consoles' sales were not excellent. Handheld consoles are, so, one of the motivations why Nintendo has always remained within the industry: they are a constant source of revenues that had helped in difficult times.

3.4.3 Stroke of luck or deliberate choice?

From a managerial point of view, how can we judge Nintendo's decisions? In this case we have to examine three points: the issue of hardware, the choice of *Tetris* and the investment in the *Pokémon* project. As concern the first one, its advantage caused by its ostensible weaknesses was a deliberate choice or a struck of luck? Given that in every successful business there is always a component of chance, in this case we can affirm that both possibilities are real. There was, indeed, a cost strategy to sell the console in the Japanese market with a price lower than ¥13.000 to guarantee high sales volume[72]. This forced engineers to detract hardware's performances in order to cut costs and the results was a final price of ¥12.500[73]. Have they foreseen the battery advantage? Probably not, since it was more a problem of competitors than an intrinsic advantage of *Game Boy*. These two characteristics, low price and high life battery, combined with wrong choices of competitors (that were a stroke of luck from Nintendo's point of view) underlie console's incredible success.

It was instead a deliberate choice selling *Tetris* bundled with *Game Boy* as the killer application. That game was already famous at that time due to PC versions, hence Nintendo only needed to pay the rights. If the cost strategy had the goal to guarantee sales, *Tetris* was needed to catch new customers. As we have seen, it was a winning move. The investment in the *Pokémon* project was, conversely, a company's intuition, a winning bet that led to *Game Boy*'s second life and the creation of *Game Boy Color*. It was even more profitable in the long period since every main game of the series was a bestseller of Nintendo's handheld consoles. In fact, the firm can influence the brand because in 1998 it was created *The Pokémon Company*, a joint venture among Nintendo, Game Freak Inc. and Creatures Inc. (a famous software house that helped in the project)[74]. The result is that nowadays *Pokémon* is the most profitable media-franchise ever, with a total of 92 estimated billion revenue (data referring to 2018). It has overcome colossuses like Mickey Mouse, Star Wars, even Mario itself (that has a total of 35 billion estimated billion revenue)[75] [76]. In other words, a success that has gone beyond every expectations that anybody could have in 1996!

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[72] Fans, Travis (July 28, 2009, updated January 14, 2012). *IGN Presents the History of Game Boy*. *IGN*. Retrieved 14 February 2020

[73] Nintendo Co., Ltd.. *Game Boy History*. *Nintendo Co., Ltd.*. Retrieved 14 February 2020

[74] The Pokémon Company official website. *https://www.pokemon.co.jp/corporate/en/*. Retrieved 16 February 2020

[75] Mighty Max (2018). *The 25 Highest-Grossing Media Franchises Of All Time*. *Title Max*. Retrieved 16 February 2020

3.5 Conclusions

The fourth generation was confirmation that videogames were reborn stronger than before. If in the home console market Sega became the main competitor of Nintendo, in the new one of handheld consoles *Game Boy* beat the competition. The creation of a market in which, as we will see in later chapters, the company was always *de facto* monopolist is one of the motivations behind its steady permanence in the video game industry. All of this because of an innovation that was possible thanks to hardware balance and some right choices in the management of killer applications.

The third generation was the moment of glory of Nintendo, and the fourth had reaffirmed its strength. However, the fifth generation was on the horizon with a new competitor that would change the balance of industrial power: Sony.

[76] In more precise terms, Mario brand is more profitable than Pokémon brand if we consider only videogames sales (Mario: 30 billion in total, Pokémon: 17 billion), but if we consider the totality (videogames, licensed merchandise, comics, films, *etcetera*) Pokémon brand is almost three times more profitable

Chapter 4 – Turnover of competitors

4.1 Era of changes

The third innovation will take place in the seventh generation, hence it is necessary to fill the time frame of the fifth and sixth. These two generations are significant from an industrial point of view due to the changes that happened in the home console market, among which stand out the rise of Sony and the decline of Nintendo. Therefore, this chapter is wholly focused on showing the main events of the fifth and sixth generation.

4.2 Fifth video game generation

4.2.1 Arrival of CD-ROMs

The fifth generation started officially in October 1993 with *3DO Interactive Multiplayer*, created by *The 3DO Company* (that was a commercial disaster). The principal novelty of this generation was the introduction of CD-ROMs as standard for the diffusion of software in place of cartridges, probably the most influent innovation happened in this industry. They brought significant improvement, including a more extensive data storage capacity, lower costs for consoles' producers, the passage from pixel art to 3D polygons and the possibility to record soundtracks from real orchestras. Although the increase of nominal power was to 32-bit, there was a console that did directly a double upgrade to 64-bit. The result was the 32/64-bit generation.

In November 1993 was released, in North America, Atari Corporation's *Atari Jaguar*, and in November 1994 was the time of Sega's *Sega Saturn* in Japan (that was released worldwide in 1995). Nintendo delayed a bit because its *Nintendo 64* was released in 1996 in Japan (worldwide in 1997). Nevertheless, none of these three was destined to command the home console market, but a new competitor that arrived in Japan just a week after *Saturn*. That competitor was nothing less than one of the inventors of CDs: Sony, with its *PlayStation*.

4.2.2 The meteoric rise of Sony

Sony Corporation (or just *Sony*, in figure 11 its official logo)[77] was founded in Japan in 1946[78]. Although it is a conglomerate firm, it is known mainly for its businesses in entertainment and electronics. For example, it developed CDs with Philips and then commercialised them in 1982[79]. It entered in video game industry in 1985, when it created a joint venture with Nintendo to realise and add-on for *SNES*[80], whose name was supposed to be "SNES-CD" or "Play Station". Despite years of works and also official announcements, the project failed in 1992, but this did not discourage Norio Ohga and Ken Kutaragi, respectively then-CEO of Sony and the firm's principal engineer involved in the project. So in 1993 was created the project "PlayStation", and removing that space between the two words from the original project was the official signal that Nintendo was no longer involved[81].

Figure 11 – Sony's logo[82]

[77] Sony Official Website. *https://www.sony.net/*. Retrieved 24 February 2020
[78] Sony Corporation. *Corporate History*. *Sony Corporation*. Retrieved 24 February 2020
[79] BBC News (August 17, 2007). *How the CD Was Developed*. *BBC News*, via *Internet Archive*. Archived from the original on December 22, 2007. Retrieved 24 February 2020
[80] Fahey, Rob (April 30, 2007). *Farewell, Father*. *Eurogamer.net*. Retrieved 25 February 2020
[81] IGN Staff (August 28, 1998, updated June 21, 2012). *History of the PlayStation*. *IGN*. Retrieved 25 February 2020
[82] © Sony Corporation

Thus, in December 1994 *PlayStation* was released in the Japanese market. A captivating design, a new type of controller and a competitive price caused to enter into competition with *Sega Saturn*, that was released just a week before. It was a fantastic success, with over than 100,000 units sold just on the first day[83], facing without problems Sega in its first month of sales. When it was launched in North America and Europe in September 1995 was even better. Thanks to its price, US$299 (in North American market)[84], focused strategies on targets and a complete openness toward third-party video games developers, *PlayStation* became the most sold console in those two markets. To this we have to add great successful games such as *Crash Bandicoot* (Naughty Dog, 1996), *Gran Turismo* (Polys Entertainment, 1997) or *Metal Gear Solid* (Konami, 1998). The result was that Sega struggled to compete in Japan and failed around the world.

4.2.3 Nintendo 64, the console without CDs

In early 1990s, Nintendo had a couple of commercial failures, not including the joint venture with Sony in which involuntary helped it to create *PlayStation*. The first was an agreement on the use of its franchises on *Compact Disc-Interactive*, console developed by the Dutch company Philips that had disaster outcomes. The second was *Virtual Boy*, a handheld console released in 1995 in which players saw video games using a sort of head-mounted display. Due to its high price and its technical deficiencies, it had poor sales and it was discontinued a year later.

The beginning of recovery was in 1996, year in which was released *Pokémon* and the new home console *Nintendo 64* (that was 64-bit instead of the 32-bit standard). It is mainly known because it was the only home console of that generation that still utilised cartridges instead of CD-ROMs. Why? Because the advent of CD-ROMs had also led to the advent of software piracy. Although Sony had inserted in its CDs some locks to recognise the original ones, hackers found ways to bypass them[85]. Nintendo to prevent it opted for cartridges, counterbalancing with the fact to be nominally the most powerful console on the market.

[83] Jones, Darran. *The PlayStation Book*: *the Ultimate Collector's Guide to the PlayStation*, *Volume 1*. Bournemouth: Imagine Publishing Ltd., 2015. Retrieved 25 February 2020
[84] IGN Staff (August 28, 1998, updated June 21, 2012). *History of the PlayStation*. *IGN*. Retrieved 25 February 2020
[85] Noble, McKinley (August 31, 2009). *5 Biggest Game Console Battles*. *PC World*. Retrieved 25 February 2020

Even though cartridges also had their strengths, they were more expensive for developers[86], they had not the technical advantages of CDs and the console itself was released late. Consequently, a lot of third-party developers preferred Sony. For example *Final Fantasy* series, for a long time one of the main series developed for Nintendo's consoles, produced its new chapters exclusively for Sony starting with *Final Fantasy VII* (Square, 1997). Nintendo then took advantage of its software division and produced industrial milestones like *Super Mario 64* (1996), *Super Smash Bros* (in cooperation with HAL Laboratory, 1999) or *The Legend of Zelda: Ocarina of Time* (1998); the last one often esteemed as the best video game ever created[87].

4.2.4 Sales in fifth generation

PlayStation was the best-selling home console in the fifth generation, with almost 75 million units sold worldwide[88]. Even though delays and mainly rely on self-produced games, *Nintendo 64* was able to preserve the second place with about 33 million units sold[89], and at the same time *Game Boy* and *Game Boy Color* were dominating the handheld console sector. *Sega Saturn* had good sales in Japan but failed around the world, not even reaching 10 million units,[90] and *Atari Jaguar* was so disastrous (just 250,000 units sold[91]) that Atari Corporation exited permanently the hardware market.

4.3 Sixth video game generation

The sixth generation started officially in 1998 with Sega's *Dreamcast*, but the actual beginning was in 2000 when Sony launched its *PlayStation 2*, followed a year later by Nintendo with its *Nintendo GameCube* (or just *GameCube*). In 2001 it was also the time for a new competitor to enter the industry: it was Microsoft with its *Xbox*. It is also known as the 128-bit generation. However, it is the last to have a denomination based on bits because consoles' power began to be definite also by other characteristics. This is the period that concluded permanently the passage in home console market from Nintendo's *de facto* monopoly to nowadays situation in which the competitors are Nintendo, Sony and Microsoft. If we can summarise it in one sentence, in the sixth generation Sony triumphed, Microsoft entered, Nintendo was in decline and Sega left the home console market.

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[86] Video Game Console Library Staff. *Nintendo 64*. *Video Game Console Library*. Retrieved 25 February 2020

[87] metacritic.com. *The Legend of Zelda: Ocarina of Time*. *Metacritic*. Retrieved 25 February 2020

[88] Sony Computer Entertainment Inc.. *PlayStation Cumulative Production Shipments of Hardware*. *Sony Computer Entertainment Inc.*, via *Internet Archive*. Archived from the original on May 24, 2011. Retrieved 25 February 2020

[89] Nintendo Co., Ltd. *Nintendo Annual Report 2005*. *Nintendo Co., Ltd*. Retrieved 25 February 2020

[90] Zackariasson, Peter; Wilson, Timothy. *The Video Game Industry: Formation, Present State, and Future*. Abigdon: Routledge, 2012. Retrieved 25 February 2020

[91] wired.com (May 15, 2007). *Console Portraits: A 40-Year Pictorial History of Gaming*. *Wired News*, via *Internet Archive*. Archived from the original on December 23, 2008. Retrieved 25 February 2020

4.3.1 Sony triumphed

The sixth generation was without a doubt Sony's moment of glory. Its *PlayStation* 2, released during year 2001, it still nowadays the most sold console ever with almost 160 million units sold [92]. If we consider only the sixth generation, it reached 100 million units, but we have to add 55 million sold in the seventh generation[93], since the console was so popular that its production continued. Furthermore, in 2001 the firm also released a second version of its first console, named it *PS One*, that alone sold about 28 million units[94]. Consider that the second most sold console in the sixth generation, Microsoft's *Xbox*, reached just 24 million units sold[95].

This was mainly due to the immense popularity that first *PlayStation* had had, creating a broad customer base that supported its success. The sales data about *PS One* are the proof of this, because it was a success even though on *PlayStation 2* customers could play with games of *PlayStation* because there was the backward compatibility! Moreover, the firm secured to have in its corner successful exclusive games (in other words developed exclusively for its console) such as *Kingdom Hearts* (Square, 2002), *Grand Theft Auto: San Andreas* (Rockstar Games, 2004) or *God of War* (SCE Santa Monica Studio, 2005). Note that the tactic to have exclusive games has always been Sony's primary strategy to sell its consoles.

[92] Sirani, Jordan (October 30, 2019, updated January 30, 2020). *Where Switch, PS4 Rank Among the Best-Selling Video Game Consoles of All Time*. *IGN*. Retrieved 26 February 2020
[93] Sony Computer Entertainment Inc.. *PlayStation2 Worldwide Hardware Unit Sales*. *Sony Computer Entertainment Inc.*, via *Internet Archive*. Archived from the original on September 21, 2013. Retrieved 25 February 2020
[94]Sony Computer Entertainment Inc.. *PlayStation Cumulative Production Shipments of Hardware*. *Sony Computer Entertainment Inc.*, via *Internet Archive.* Archived from the original on May 24, 2011. Retrieved 26 February 2020
[95] xbox.com (May 10, 2006). *Gamers Catch Their Breath as Xbox 360 and Xbox Live Reinvent Next-Generation Gaming*. *Microsoft*. Retrieved 26 February 2020

4.3.2 Microsoft entered

We have already discussed the results of Microsoft's *Xbox*, but who was this new competitor? *Microsoft Corporation* (or just *Microsoft*, in figure 12 its official logo)[96] is an American firm founded by Paul Allen and Bill Gates in 1975[97]. Specialised in IT, it is known primarily for its operating system Windows. Its entrance in the video game world had already happened for several years as a publisher of successful PC Games, such as *Microsoft Flight Simulator* (series begun in 1982) or *Age of Empires* (Ensemble Studios, 1997). The idea of a console arose to show the power of its application programming interface, *Microsoft DirectX*. The choice of the name was particular. It should have been named "Direct X-Box" but as reported by Exec Fries, one of the engineers that worked on the project:

"Direct X-Box, of course, was truncated to 'Xbox' – and marketing hated the name. (…) In focus testing, the marketing team left the name 'Xbox' on that long list simply as control, to demonstrate to everyone why it was a terrible name for a console. Of course, 'Xbox' outscored, in focus testing, everything they came up with. They had to admit it was going to be the 'Xbox'." [98]

Figure 12 – Microsoft's logo[99]

[96] Microsoft Official Website. *https://www.microsoft.com/*. Retrieved 26 February 2020
[97] BBC News (July 15, 2006). *Bill Gates: A Timeline*. *BBC News Online*, via *Internet Archive*. Archived from the original on June 22, 2006. Retrieved 26 February 2020
[98] Alexander, Leigh (August 14, 2009). *Interview: Former Microsoft Exec Fries Talks Xbox's Genesis*. *Gamasutra*, via *Internet Archive*. Archived from the original on May 25, 2011. Retrieved 26 February 2020
[99] © Microsoft

Therefore, in November 2001 *Xbox* was released in North America (then worldwide in 2002). The main trait of the console was to be the first one to rely strongly on multiplayer online game, via one of the first online gaming services. It was *Xbox Live*, made available in November 2002[100]. Although Sony has taken the exclusive on successful series, Microsoft had its bestseller games, such as *Halo* series (especially *Halo 2*, Bungle, 2004). As mentioned above, the console reached 24 million units sold.

4.3.3 Nintendo was in decline

Nintendo released its *GameCube* worldwide between 2001 and 2002, and with it the firm adopted CD-ROMs. Similarly to *Xbox*, it was not really a commercial failure with its 22 million units sold[101]. It also had many exclusive appreciated games, such as *Super Smash Bros. Melee* (HAL Laboratory, 2001), *Metroid Prime* (in cooperation with Retro Studio, 2002) or *Resident Evil 4* (Capcom, 2004), but did not reach the extraordinary success of *PlayStation 2*, on the contrary was third in terms of sales. The firm was not anymore the leader of the home console sector but a competitor, not in failure but unable to approach the new industry's dynamics optimally.

If in the home console sector it was in decline, in the handheld console sector continued to be the uncontested leader. In 2001 it released *Game Boy Advance*, that despite the same brand this time it was a new console more potent than *Game Boy*. Two versions with different designs followed it: *Game Boy Advance SP* in 2003 and *Game Boy Micro* in 2005 (curiously, a year later after *Nintendo DS*, its successor). All the versions together reached over 80 million units sold[102]. By comparison, the second most sold handheld console in that period was Nokia's *N-Gage* with just 3 million units sold[103].

[100] Microsoft Stories (November 15, 2002). *Xbox Live Arrives in Stores, Sparking the Next Revolution in Video Games. Microsoft News.* Retrieved 26 February 2020
[101] Nintendo Co, Ltd. (October 27, 2010). *Consolidated Sales Transition by Region*. *Nintendo Co, Ltd.*, via *Internet Archive*. Archived from the original on July 21, 2011. Retrieved 26 February 2020
[102] Nintendo Co, Ltd. (October 27, 2010). *Consolidated Sales Transition by Region*. *Nintendo Co, Ltd.*, via *Internet Archive*. Archived from the original on July 21, 2011. Retrieved 26 February 2020
[103] Blake Snow (July 30, 2007). *The 10 Worst-Selling Handhelds of All Time*. *GamePro.com*, via *Internet Archive*. Archived from the original on July 30, 2008. Retrieved 26 February 2020

4.3.4 Sega left the home console market

If *Sega Saturn* had not good commercial results because it could not handle the competition with Sony, *Dreamcast* was even worse. The console was released between 1998 and 1999, and it was cutting edge from a technical point of view. For example, it was the first console to have an incorporated modem for gaming online; furthermore it had innovative games like *Shenmue* (1999). Although at the beginnings its sales were fine, it was overcome by *PlayStation 2*, so its total sales were just 10 million units[104]. Therefore its production was discontinued very early in January 2001, with an official announcement from Sega to restructure the firm and to stop to produce consoles[105]. Since then it became one of the most appreciate third-party developers.

4.4 Nintendo as a unicum in video game industry

One of the objectives of this paper is to show how Nintendo did manage to remain always active in video game field. At this point, we can understand why there is this focus. The whole industrial history from the beginnings to the fourth generation had as major players companies with business only in video game world: Atari, Atari Corporation, Sega and Nintendo. The fifth and sixth generation had instead introduced two new competitors, Sony and Microsoft, that had numerous diversified business. With Atari Corporation and Sega outside the hardware market, Nintendo is nowadays the only developer of consoles to remain entirely in video game industry.

The first two innovations were ideated in a competition environment among specialised companies. The next two that we will analyse had taken place in a very different industry in which Nintendo was the only one not to have diversification in its business portfolio. Lost its position of leadership, it had to found a way to face its new opponents.

During *GameCube*'s official presentation, Nintendo used a term to indicate the difference between the company and its competitors. It named as the "Nintendo Difference"[106], and since then is a sort of slogan to indicate how the firm wants to differentiate itself from the others - and with the seventh generation around the corner it was going to show that concept very well.

[104] O'Rourke, Patrick (May 6, 2014). *Press Start: Sega's failed Dreamcast console has actually outsold Nintendo's Wii U (sort of)*. *Canada.com*. Retrieved 26 February 2020
[105] Ahmed, Shahed (January 31, 2001). *Sega announces drastic restructuring*. *GameSpot*. Retrieved 26 February 2020
[106] Fielder, Lauren (May 16, 2001). *E3 2001: Nintendo unleashes GameCube software, a new Miyamoto game, and more*. *GameSpot*. Retrieved 26 February 2020

Chapter 5 – How to navigate in a blue ocean

5.1 Change of strategy

The last two generations had radically changed the scenario in the home console sector. Whereas before Nintendo commanded with Sega that tried to reach it, now Sony and Microsoft were the new protagonists. The owner of Super Mario had to find a way to recover from the situation of uncertainty. It needed another innovation, a third to come back to being important in the market. This chapter focuses on the explanation of that innovation and its effects both on seventh and eighth generation. We will begin with a summary of the main events in the seventh generation, then we will examine Nintendo's console, and lastly we will examine its effects in the eighth generation.

5.2 Seventh video game generation

5.2.1 Nintendo-Sony duopoly in handheld console sector

The seventh generation began with handheld consoles in November 2004 with *Nintendo DS* followed a month later by Sony's *PlayStation Portable* (or just *PSP*). Nintendo had as main traits the usage of two displays, one of which touch screen, and an integrated microphone. It was the first of a product family named *"Nintendo DS Family*". Between 2006 and 2011 indeed were released other three versions, such as *Nintendo DS Lite* (2006), *Nintendo DSi* (2008-2009) and *Nintendo DSi XL* (2009-2010), that had more performing hardware and in the latter case also bigger displays.

PSP, instead, focused on its hardware and its multimedia. It was the only handheld console to use discs instead of cartridges, employing a specific format named *Universal Media Disc*, that also permitted to see films and listening to music. It also had a series of other versions, among which stands out *PSP Go* (2009) for its very different design.

It was the only time in the in the history of the segment that a "console war" took place. *PSP* had excellent sales, reaching about 82 million units sold[107]. Despite this, Nintendo continued to keep its leadership position, because *Nintendo DS Family* overall sold near 155 million units[108], making *Nintendo DS* the second console most sold ever[109].

[107] Moriarty, Colin (November 17, 2014). *Vita Sales Are Picking Up Thanks to PS4 Remote Play*. *IGN*. Retrieved 6 March 2020

[108] Nintendo Co, Ltd. (October 27, 2010). *Consolidated Sales Transition by Region*. *Nintendo Co, Ltd*., via *Internet Archive*. Archived from the original on July 21, 2011. Retrieved 6 March 2020

[109] Sirani, Jordan (October 30, 2019, updated January 30, 2020). *Where Switch, PS4 Rank Among the Best-Selling Video Game Consoles of All Time*. *IGN*. Retrieved 6 March 2020

5.2.2 Three-way console war among home consoles

Regarding the home console segment, there were three leading competitors. In November 2005 was released Microsoft's *Xbox 360*, followed a year later by Sony's *PlayStation 3* and Nintendo's *Wii*[110] (figure 13). The strategies of the first two consoles were actually somewhat similar. Both focused on hardware performance and graphics, releasing games produced by them or third-party developers, and both had three different versions. The main differences were that Sony relied on exclusive games and the usage of Blu-Ray Discs, that permitted a larger storage capacity. Whereas, Microsoft had its strength in gaming online continuing its service *Xbox Live*, even if Sony had tried to reply in 2006 with *Play Station Network*, a sort of social network.

Figure 13 – Wii[111]

[110] As referred in the Nintendo Style Guide, the official name is "Wii", not "Nintendo Wii" (which is how it is unofficially known)
Nintendo Co., Ltd. *Nintendo Style Guide*. *Nintendo Co., Ltd*., via *cryptosystem.org*.. Retrieved 7 March 2020
[111] © Nintendo Co., Ltd.

Both made excellent sales: *Xbox 360* reached about 85 million units sold[112] and *Play Station 3* 87 million[113]. However, the winner of "console war" in the seventh generation was *Wii* with about 100 million units sold[114]. How it was possible that Nintendo in just a generation recover so fast from the decline and even returned in a leadership position? The secret was in its console and the third innovation, that this time was an actual new market approach: Nintendo had successfully navigated in a blue ocean.

5.3 How Wii took advantage of video games' blue ocean

5.3.1 Red ocean and Blue ocean

With "blue ocean" we are referring to the "Blue Ocean Strategy"[115]. To explain it is used a metaphor in which we can imagine the market as an ocean, with companies that compete in a specific section, that one where profits are high. Consequently, due to the trade war there is a bloody red ocean, hence a competition strategy is denominated Red Ocean Strategy. However, this implies that there are other sections in the ocean in which there is not a competition and the water is still blue. The Blue Ocean Strategy involves exploring those waters, to discover unexpressed potential of own industry and to take advantage of the absence of competition. It is not merely a matter of differentiation, because the goal is not to stand out from competitors but to go where there are not.

Wii has become an actual textbook case, mentioned as a case study in books that treat the subject. Consequently, this paper wants to discuss about the console in a way slightly different from usual. On one hand, at this point we are aware of the context in which *Wii* competed, so we can understand better its peculiarities compared to other consoles. On the other hand, the subject will not analyse only the seventh generation's background, but also will examine the effects that it caused on Nintendo in the following generation.

[112] Makuch, Eddie (June 9, 2014). *E3 2014: $399 Xbox One Out Now, Xbox 360 Sales Rise to 84 million*. *GameSpot*. Retrieved 7 March 2020
[113] Sony Interactive Entertainment. *SIE Business Development*. *Sony Computer Entertainment*. Retrieved 7 March 2020
[114] Nintendo Co., Ltd.. *IR Information: Sales Data - Hardware and Software Sales Units*. *Nintendo Co., Ltd*.. Retrieved 7 March 2020
[115] Kim, W.Chan; Mauborgne, Renée. *Blue Ocean Strategy: How to Create Uncontested Market Space and Make Competition Irrelevant*. Cambridge: Harvard Business School Press, 2005. Retrieved 7 March 2020

5.3.2 Inclusiveness as the main goal

"(...) We're not thinking about fighting Sony, but about how many people we can get to play games. The thing we're thinking about most is not portable system, consoles, and so-forth, but that we want to get new people playing games."[116]

The words of Nintendo's then-president Satoru Iwata (succeeded to Hiroshi Yamauchi in 2002) make clear which were firm's priorities as regarding *Wii*. The point was not more to compete with Sony (and implicitly also with Microsoft) but to attract new people to play, that is attracting new clientele. The focus was not to target customers inside the market but "noncustomers". Blue Ocean Strategy defines them as potential buyers that are outside the market. Generally they are divided into three tiers: those who would enter in the market but there is a lack of specific triggers, those who know the market but have decided not to purchase, and those who do not know it.

It is hard to say if *Wii* had a specific target tier, since it wanted to include as many people as possible. After all, the name itself *Wii* had been chosen because it was phonetically similar to "we" to highlight this peculiarity and the two "I" lowercase represented two persons gathered to play.[117]. Instead we have to find who are generally "noncustomers" in video game industry. An "usual" customer has 18-35 years: in this age range there is over 50% of players[118]. This because in that age range there are new players and those who were young at the time of previous video game generations; we also have to consider that from the fifth generation had appeared games with mature themes with a target older than teenagers. Accordingly, *Wii* targeted clients younger and older than the main range. If we try to visualise it, we can see as a reference model a family. We have parents, children/young teenagers, even grandparents, all together gathered to play. But how actualise a similar situation?

[116] Gantayat, Anoop (December 12, 2006, updated May 14, 2012). *Dragon Quest IX Q&A*. *IGN*. Retrieved 7 March 2020
[117] Carless, Simon (April 27, 2006). *Breaking: Nintendo Announces New Revolution Name - 'Wii*. *Gamasutra*. Retrieved 7 March 2020
[118] Morris, Carolyn Pairitz (April 19, 2018). *The Demographics of Video Gaming*. *Earnest*. Retrieved 7 March 2020

5.3.3 Moving controllers

Wii was not innovative only from a commercial point of view, but also had an important technical innovation. Indeed its primary controller, *Wii Remote*, combined keystrokes with the movement of the controller itself (based upon infrareds and accelerometers), allowing to the console to calculate its position in the 3D space[119]. This system then was perfected with *Wii MotionPlus* (released in 2009) that permitted a more precise calculation. Although it was not the first in which the movement of players was used (for example there was *EyeToy*, a sort of webcam for *PlayStation 2*), it was the first console to utilise it since the beginning. Later Sony and Microsoft tried to replicate it creating respectively *PlayStation Move* (2009) and *Kinect* (2010) for their consoles.

Let us take for example *Wii Sports* (2006), bundled with the console (in figure 14 a screenshot). In the game players can choose among five sports: tennis, baseball, bowling, golf and boxing. In each of them, controls are not restricted to keystrokes, but players have to imitate the movement of rackets and clubs with *Wii Remote*. There was not just a matter of movement opposed to the sedentariness of a usual controller, but also the immediacy in learning commands. So, it was more accessible to people that were not accustomed to video games. Other games ideated to be played together were *Wii Music* (2008) and *Wii Party* (2010).

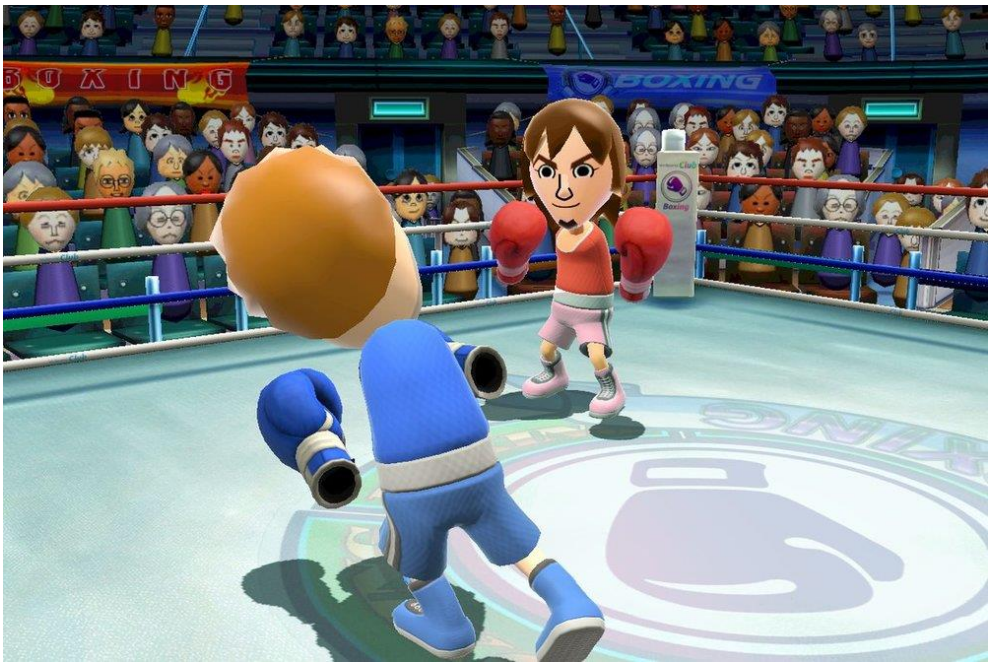

Figure 14 – A screenshot from "Wii Sports"[120]

[119] Castaneda, Karl (May 13, 2006). *Nintendo and PixArt Team Up*. *Nintendo World Report*. Retrieved 7 March 2020

[120] © Nintendo Co., Ltd.

Among accessories released for the console, noteworthy was *Wii Balance Board* released with *Wii Fit* (2007). It was a controller with the shape of a balance board that tracked player's barycentre, permitting to play games that use it. Despite the focus on this typology of games, Nintendo did not forget its habitual customers and were also released "usual" successful products like *Super Mario Galaxy* (2007), its sequel *Super Mario Galaxy 2* (2010) and *No More Heroes* (Grasshopper Manifacture, 2007).

5.4 Eighth video game generation

The eighth video game generation is the current one and continues nowadays. It is begun in February 2011 in handheld console sector with *Nintendo 3DS* followed in December by Sony's *PlayStation Vita*. Although in the last generation they competed, in this one is Nintendo's console to dominate. It has all the main traits of *Nintendo DS* with the addition of creating 3D stereoscopic images without using specific glasses. It is still in production because there were released other five versions, the last ones with more powerful hardware, between 2012 and 2017.

So, sales data are provisional, with the last update to 75 million units sold[121]. On the contrary *PlayStation Vita*, despite it had great support from indie developers (software houses not connected with the big names of software sector), was a failure. Official sales data were not released, but they have been estimated at around 16 million units sold[122]. It was discontinued in 2019, making Nintendo the segment's actual monopolist.

Regarding home console segment, in November 2012 it was released Nintendo's *Wii U* (figure 15), followed a year later by Sony's *PlayStation 4* and Microsoft's *Xbox One*. Furthermore, there was a fourth console produced by Nintendo: *Nintendo Switch*, released in 2017. At this point is necessary to split the discussion to maintain coherence. All sales data and characteristics of Sony and Microsoft's consoles, as well the new implications caused by the rebirth of PC market and *Nintendo Switch* we will be discussed in the next chapter. For now we have only to know that *Wii U* was a commercial failure, with about 13 million units sold[123]. The long term effect on the company of *Wii*'s success was the failure of its successor. How was it possible? Why this breakdown from 100 million units sold to just 13?

[121] Nintendo Co., Ltd.. *IR Information: Sales Data - Hardware and Software Sales Units*. *Nintendo Co., Ltd*.. Retrieved 7 March 2020
[122] Kim, Matt (20 September 2018). *PS Vita Production in Japan Will End in 2019, No Successor Planned*. *USgamer.net*. Retrieved 7 March 2020
[123]Nintendo Co., Ltd.. *IR Information: Sales Data - Hardware and Software Sales Units*. *Nintendo Co., Ltd*.. Retrieved 7 March 2020

Figure 15 – Wii U[124]

5.5 Why Wii U was a failure?

Wii was a console that mainly targeted "casual players", a term in industrial jargon to refer to those that occasionally play without particular interest, but this moved away the habitual "heavy players". The consequence was that the console was positioned differently from the others[125], which in the context of a Blue Ocean Strategy would be one of the goals. However, there was a fundamental problem. One of industry's primary dynamics is the generational transition from a console to another one, in which firms try to attract as many players as possible to buy new consoles. For example, one of the reasons behind *PlayStation 2*'s great success was because its predecessor had created and made many loyal customers. We can apply this line of reasoning to every console, except for *Wii*, because it targeted a clientele that was not interested in the process.

[124] © Nintendo Co., Ltd.
[125] Beausoleil, Micheal (November 7, 2019). *What Made the Wii U Nintendo's Greatest Failure*. *Medium*. Retrieved 8 March 2020

Nintendo noticed it and tried to position *Wii U* as a console dedicated to passionate players, returning to compete with Sony and Microsoft (in other words it returned in a Red Ocean Strategy, maybe involuntarily). However, that is where the console showed its weakness. It was judged as less performing compared to competitors, factor that led to limited support by third-party developers[126], and there were concerns about *Wii U GamePad*, its tablet-like controller. Furthermore, the name itself had led to confusion, making it look like an add-on for *Wii*, not a new console[127]. The concatenation of these factors, combined with the problem of generational transition, was the reason of that commercial failure. The console was discontinued in January 2017, a couple of months before the release of its successor *Nintendo Switch*.

5.6 Wii and Wii U, two sides of the same coin

5.6.1 Even a blue ocean has its dark depths

In the case of *Wii* we should argue about two innovations: the technical one of *Wii Remote* and the approach with Blue Ocean Strategy. However, the former is a part of the latter and so we can do a unitary speech. So, how to judge a strategy that we could define as a clientele innovation or even as an approach innovation? A similar strategy is without a doubt a risk, because it is based on the exploration of potential clientele whose reactions are virtually unknown. Nintendo in this had to rely on different values from the industrial standard, preferring a console focused on gameplay and fun instead of hardware performances.

These values were actually sought after by a part of potential customers, otherwise we could not explain the success of *Wii*. The technical innovation of *Wii Remote* has further reinforced the concept of a console different from the other opposing, for example, sedentariness with movement or control complexity with simplicity. But if this attracted "causal players", it also repulsed "heavy players". It is true that *Wii* had in its software library game designed for them, some even successful, but overall it was not a console perceived as an actual alternative to *PlayStation 3* and *Xbox 360*. This factor was evident with the generational transition, where the console had a clientele that was not interested in buying a new one.

The strategy in long term had worked against the firm itself, that had to propose a console without a precise market target. It could not target *Wii's* customers because they were outside the process of generational transition, and at the same time it was positioned in such a way that had repulsed clientele that could have bought *Wii U*. The failure of *Wii U* was not only due to Blue Ocean Strategy's fault, since there was also a series of causes uniquely related to the console, but it was the primary motivation.

[126] Gittins, Liam (July 3, 2015). *Why the Wii U Really Failed*. *VGU*. Retrieved 8 March 2020
[127] Baig, Edward (January 14, 2017). *Nintendo's Reggie Fils-Aime: Why Switch is different from Wii U*. *Usa Today*. Retrieved 8 March 2020

5.6.2 An incompatible strategy?

Can Blue Ocean Strategy be applied with success in the videogame industry? In order to answer this question, we have to consider that this industry has always counted on two typologies of customer loyalty: one related to consoles and another one to series. These two help each other, because players are attracted by console according to games that they prefer. After all, Sony's primary strategy to have many exclusive games is due to this reason. Also Nintendo has always taken advantage of its franchises, linked with its name e consequently to its consoles. So at the time of generational transition players will buy new consoles to continue playing with their favourite series.

Wii instead has created a new clientele and new franchises. In other words, *Wii* was not the console for fans of Super Mario or Zelda, but the console of families gathered together to play *Wii Sports*. This position did not create customer loyalty in the long term, since non-habitual players are, trivially, players that will not buy a new console because they are okay with the old one. It was not enough to have games of the leading franchises both on *Wii* and *Wii U* to keep regular clientele, that most likely had shifted to competitors or saw in *Nintendo DS* "its" console.

Therefore, is Blue Ocean Strategy incompatible with the industry? Not necessarily, but it is very risky. A sustainable realisation on the long term implies to transform non-habitual customers into "heavy players" in the short term, but this is a goal really challenging and conditioned by many factors. Is it possible to design a console that at the same time attracts both habitual and new players? This was *Wii*'s primary purpose, and it has demonstrated that is it possible but only in a single generation. Nevertheless, this does not imply that there are no other hidden values to attract habitual players. After all, some argue that we could also consider the creation of handheld consoles as an example of successful Blue Ocean Strategy[128]. *Wii* and *Wii U* lead to the conclusion that for this type of strategies firms have to plan both on short and long term.

[128] Muddle, Ty (June 22, 2016). *Understanding Nintendo's Blue Ocean Approach to NX*. *SquishTurtle*. Retrieved 8 March 2020 (Please note: "NX" was the codename of *Nintendo Switch*)

5.6.3 Short term success, long term failure

From a managerial point of view, despite what was said previously, Nintendo was right to try Blue Ocean Strategy. The firm's decline was due to *PlayStation* and *PlayStation 2*, that had defeated its consoles in terms of popularity and hardware. *Xbox*, even if its sales were similar to *GameCube*, conquered more clientele and, indeed, in the next generation Sony and Microsoft made similar sales results. What was *Wii* if not the awareness that Nintendo was forced to try another way in the home console sector? Regarding the seventh generation, the company made exact choices to identify noncustomers and created products that attracted them, and won the "console war" of that generation.

Troubles came with the next generation. We can split them between those linked with *Wii U* itself and those connected with the generational transition, although they are related each other. Nintendo was back to compete with other firms in a Red Ocean competition, but this highlighted those technical flaws that were one of the motivations for which Nintendo had tried an alternative with *Wii* in the first place. *Wii U* tried to regain the regular clientele but relying on a success achieved with "casual players". It is difficult to say if without *Wii U*'s technical weaknesses the console could have been successful, because several factors caused its failure and not everyone is directly connected with the fact to be *Wii*'s successor.

If we want to identify the fundamental problem, it lay in the bad management of *Wii U*. It had already a disadvantage because it had to attract both *Wii*'s customers and fans of Nintendo’s franchises, but it failed both goals. Coming back in Red Ocean competition was a severe mistake, because it should have focused on the not easy task to maintain loyal the clientele generated with *Wii*. After all, at that time Nintendo had sold a lot (and so had also cashed in a lot) thanks to the extraordinary success of both *Wii* and *Nintendo DS Family*. Therefore, it could afford to take the risk and trying to transform its new customers into "heavy players".

5.7 Conclusions

Nintendo over two generations saw its greatest success in the home console sector followed by its greatest failure. Applying Blue Ocean Strategy brought benefits in the short term but managerial difficulties in the long term. In the middle of the eight generations with the other two home consoles that continued to sell, it had to find a way if it did not want to focus only on handheld consoles.

However, the company was learning from its mistake and during the years of *Wii U*'s failure it was preparing its next console. Once again, Nintendo was going to prove its capability to get back on its feet.

Chapter 6 – Toward a hybrid future

6.1 Recovering from failure

We have started from the first chapter describing video game industry from the earliest days, passing from time to time through generations. We have seen Atari dominating the industry and then close down, Sega that have partially abandoned the market, and Sony and Microsoft changing its equilibrium. We have observed an industry that has recovered from a crash, diversifying in various segments and attracting more and more players. And in all this, Nintendo has always been a staple. Indeed, if we consider that it commercialised *Magnavox Odyssey* in Japan in 1974[129], we realise that it is the only firm that operates in this industry from the beginning.

Now is time to describe industry's current situation and how Nintendo recovered from *Wii U* disaster with *Nintendo Switch*, its fourth and last innovation. First, we will finish the description of the eighth generation, with also respect to the new PC and mobile market, then we will analyse Nintendo's console and lastly we will try, in the analysis section, to hypothesise its effects in the industrial future.

6.2 Current situation of industry

6.2.1 Home console segment

As depicted in the last chapter, between 2012 and 2013 three consoles have been released: *PlayStation 4*, *Xbox One* and *Wii U*. The first two are on the market, so their sales data are temporary. However, it is probable that will *PlayStation 4* win this generation "console war", since in the last update its three versions' total sales are about 106 million units sold[130], making it currently the fourth best-selling console ever[131]. Instead *Xbox One*, despite it also has three versions, its sales are estimated at around 50 million units[132].

[129] See 1.4.3
[130] Sony Interactive Entertainment (July 1, 2020). *Playstation™ Network Monthly Active Users Reaches 103 Million*. *Sony Computer Entertainment.* Retrieved 16 March 2020
[131] Sirani, Jordan (October 30, 2019, updated January 30, 2020). *Where Switch, PS4 Rank Among the Best-Selling Video Game Consoles of All Time*. *IGN*. Retrieved 16 March 2020
[132] Miche, Hunter (November 13, 2019). *Xbox One Sales Reach 50 Million In New Turtle Beach Earnings Call*. *SegmentNext*. Retrieved 16 March 2020

Due to *Wii U*'s failure, Nintendo in the middle of eighth generation released in March 2017 a new console, *Nintendo Switch* (figure 16), that has currently sold about 52 million units[133]. It has achieved the same sales of *Xbox One* but in half time. The firm of Super Mario has quickly recovered from the big mistake that has done with its previous console. Before continuing, it is necessary to specify that a release in middle generation has raised a doubt: it is an eighth or ninth generation console? The question is not trivial, since from the period post-1983 crash no company has released two consoles in the same segment and in the same generation. Despite some disagreement, it is generally considered as an eighth generation console. In any case, Sony and Microsoft have announced that their new consoles, *PlayStation 5* and *Xbox Series X*, we will be released at the end of 2020[134] [135], so they will officially start the ninth generation.

Figure 16 – Nintendo Switch[136]

[133] Nintendo Co., Ltd.. *IR Information : Sales Data - Hardware and Software Sales Units*. *Nintendo Co., Ltd.*. Retrieved 16 March 2020
[134] Hood, Vic; Bill, Thomas (March 18, 2020). *Xbox Series X release date, specs, design and launch titles for the next Xbox*. *Techradar*. Retrieved 18 March 2020
[135] Rubin, Peter (October 8, 2019). *Exclusive: A Deeper Look at the PlayStation 5*. *Wired*. Retrieved 16 March 2020
[136] © Nintendo Co., Ltd.

6.2.2 Rise of PC sector and birth of mobile segment

During the last two generations, other two markets are appeared in the video game field: PC Gaming market and mobile market. The former has always existed but since the crash of 1983 has always remained in the background, even if over the years has created milestones of software sector such as *Doom* (id Software, 1993), *Half-Life* (Valve, 1998), its sequel *Half-Life 2* (Valve, 2004) or *Minecraft* (Mojang, 2011). The last is also the bestselling videogame ever, with about 180 million copies sold[137]. The segment has begun to be a consolidated presence since 2002, year in which was opened *Steam*[138], the first and still today leading sales platform of PC games' digital copies.

What happened? In the last decade, the exponential technological progress of PCs power, in whose industry operate companies such as *Nvidia* and *Advanced Micro Devices* (commonly known as *AMD*), has made their performances better than consoles itself. Assembling a "PC Gaming" is much more expensive to buy a console, but guarantees the best possible performances. So, Sony and Microsoft have run for cover, releasing *PlayStation 4 Pro* and *Xbox One X* respectively, that have a higher price but also higher performance compared to their standard versions. Furthermore, Sony continues with its strategy to have exclusive games as much as possible. Microsoft, instead, try to take advantage of the fact that is also the owner of *Windows*, the operating system run by the majority of PCs, utilising the so-named "cross-play". In a few words, it is possible paying a digital version of some games released for *Xbox One* and then download them both on console and PC, allowing to share save files and to move from a version to another one when players want it[139].

As concerns the mobile sector, it appeared essentially together with the first smartphone, *Apple*'s iPhone, in 2007 (note that also tablets are included). This sector is composed mainly to small free-to-play games, even if there are paid-for products appreciated by both public and critics, for example *The Room* series (Fireproof Games, started in 2012). Curiously, the first big company that had taken an interest in this segment is Nintendo, that has started to release game starting from 2016 with *Super Mario Run*. Moreover, some argue that the tablet-like controller of *Wii U* had (involuntarily) made to think that it wanted to compete or intercept potential customers of this market[140]. Since games are developed for the main models of smartphones, it is the only segment in software sector that do not produce for a specific gaming hardware sector.

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[137] Dent, Steve (November 11, 2019). *Minecraft player count reaches 480 million*. *PCGamesN*. Retrieved 17 March 2020
[138] Steam Official Website. *https://store.steampowered.com/*. Retrieved 17 March 2020
[139] xbox.com. *Xbox Play Anywhere*. *Microsoft*. Retrieved 17 March 2020
[140] Beausoleil, Micheal (November 7, 2019). *What Made the Wii U Nintendo's Greatest Failure*. *Medium*. Retrieved 17 March 2020

6.3 Nintendo Switch, the hybrid console

6.3.1 Consoles' third way

Considering what mentioned above, it is not a surprise that Nintendo failed to go back to the main competition. But, actually, the firm has never been interested in doing it (if we consider *Wii U* as an error of strategy), and *Nintendo Switch* is considered as the coherent continuation of *Wii*'s Blue Ocean Strategy[141]. Its primary peculiarity is to be the first "hybrid" console, that means that it is at the same time a home and a handheld console. Players can connect it to a television through a dock, or carry it around using its internal batteries. This brings us back to the problem of electrical energy consumption already addressed in the third chapter[142], but this time the situation is different. Targeting another clientele and keeping itself away from the main competition, it has created its market segment conscious that its console is less powerful than the others but has the uniqueness to be hybrid.

Besides, this console takes the best from its predecessors. Thus its controllers, a pair of *Joy-Con*, can be used both joined to the console but also detached, permitting some controls with movements similarly to *Wii Remote*. In handheld modality its display is a touchscreen, and its shape similar to a tablet it is a finishing of the concept behind *Wii U Gamepad*, not to mention the previous experience in the field due to *Nintendo DS* and *3DS*.

The question is if *Nintendo Switch* is the successor both of *Wii U* and *Nintendo 3DS*. Surely it is the successor of the former, but for the latter there are perplexities. On one hand, its production has been confirmed also for this year, because it still sells and the firm sees in its lower and lower price a way to attract new players[143]. So, for three years the two consoles coexist. On the other hand, not only *Nintendo Switch* is selling optimally, but has been released *Nintendo Switch Lite*, an exclusively handheld version. Furthermore we have to consider that the console was in developing since 2012[144], but probably *Wii U*'s failure has anticipated its release dates and maybe this has clashed with *Nintendo 3DS*'s long-term plans. Only an official announcement from Nintendo will give us an answer.

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[141] Ohannessian, Kevin (January 20, 2017). *With Nintendo's Switch Game Console, New Ideas Create New Experiences*. *Fast Company*. Retrieved 18 March 2020

[142] See 3.3.2 and 3.4.1

[143] Webster, Andrew (November 7, 2019). *Nintendo boss Bowser on Switch Lite sales, 3DS support, and tiny retro consoles*. *The Verge*. Retrieved 18 March 2020

[144] Hester, Blake (December 26, 2017). *How the Polarization Of Video Games Spurred the Creation of the Switch*. *Rolling Stone*, via *Internet Archive*. Archived from the original on December 26, 2017. Retrieved 18 March 2020

6.3.2 Conversion of games

Every console is successful if it has also convincing games and strong support from third-party developers, and after *Wii U*'s disaster Nintendo made sure that at the official announcement there were many development houses producing games for its new console. At the same time, it continues its production of successful games, such as *The Legend of Zelda: Breath of the Wild* (2017, in figure 17 a screenshot), that it was released both on *Wii U* and *Switch*.

Figure 17 – A screenshot from "The Legend of Zelda: Breath of the Wild"[145]

The company has also considered another fact: despite all, *Wii U* had some games with relative success. They have sold a lot but at the same time console's poor sales generated an unexpressed sales potential. Consequently, Nintendo has decided to rerelease them on *Nintendo Switch* in an improved version, such as *Mario Kart 8* (2014) that was rereleased as *Mario Kart 8 Deluxe* (2017).

[145] © Nintendo Co., Ltd.

6.4 Nintendo Switch and the future of industry

All the analysis previously made in this paper has carried out making connections with certain industrial pieces of information. Due to the topicality of *Nintendo Switch*, this is not possible. Therefore, this analysis will have a speculative nature and will try to identify how the console can influence the market.

6.4.1 Does Blue Ocean Strategy continue?

Like *Wii*, the success of *Nintendo Switch* is based on a mixture between a technical innovation and an innovative approach. We will discuss the technical one in industrial analysis, because the only relevant novelty is the "hybrid" fact. Regarding the approach, the console is considered as a continuation and application of that Blue Ocean Strategy that made the success of *Wii*. Some argue that Nintendo would have started that approach since the days of *Game Boy*[146] (and then expanded it also to home consoles). Are we really dealing with one of the longest Blue Ocean Strategy ever made?

The argument has a solid foundation, especially if we consider *Wii U* as a mistake and not as a voluntary return to the main competition. Surely starting from *Wii* there was the will of Nintendo to differentiate itself as much as possible from its competitors and create its market segment. It seems a move similar to that one made in the fourth generation when it created handheld consoles. However, both *Game Boy* and *Nintendo Switch* require some reflections.

Regarding *Game Boy*, we have to remember that Nintendo from the beginning was implementing a cost approach to cut the price[147]. The result was that handheld consoles, at any time, were always cheaper compared to home consoles. Consequently, the path chosen by Nintendo was to intercept a price-sensitive clientele that was interested in consoles - but this alone is not enough to claim that it was a Blue Ocean Strategy. Furthermore, in the segment was created a *de facto* monopoly that it was temporarily interrupted only by *PlayStation Portable*. That situation positioned the segment very differently compared to the rest of industrial production, making it very difficult if not impossible making direct comparisons. Besides, the will to differentiate through "Nintendo Difference" started in the sixth generation, not throughout the fourth one when Nintendo was the leader with *Super Famicom*/*SNES*.

[146] See 5.6.2
[147] See 3.3.4

We can apply a similar argument to *Nintendo Switch*. Currently there is a market segment that focuses on high hardware performance and for this there are high prices. In that segment now compete Sony, Microsoft, and production companies of PC Gaming hardware such as Nvidia e AMD. In this perceptive, Nintendo has positioned itself in a lower price range, focusing on the "differentiation factor" and staying away from that competition. However, at the same time it is not targeting "noncustomers", but it is intercepting those players that are more price-sensitive and searching other characteristics beyond performances. Nevertheless, this does not mean that researching other values is not a Blue Ocean Strategy, and in this sense Nintendo could intercept the noncustomers tier of those who are on the edge of the market. In conclusion, *Nintendo Switch* can be considered as a successor of *Wii*'s innovative philosophy, even if it does not fall entirely in the parameters of a Blue Ocean Strategy.

6.4.2 The evolution of handheld consoles?

From an industrial point of view, an innovation like a hybrid console raises a couple of significant questions. Has a new market segment created, or a sort of halfway niche? Considering that Nintendo is the monopolist of handheld consoles, are hybrid consoles their evolutions? An answer is very difficult, and it depends very much from the market response to this novelty.

Let us start with the latter question. The technological progress now is so great that even handheld consoles can have good hardware power although lower than home devices. *Nintendo Switch* wants to do a further step and tries to be an equilibrium point to offer an experience similar to both home and handheld console, but it cannot be the link between the two sectors. The problem of electrical energy consumption returns, because modern high-end devices absorb a lot. So, the hybrid console is after all a handheld device that can be used with a television. But this implies that it would actually be the evolution of handheld consoles, that reached a point where players can enjoy a complete experience renouncing to high performances. If Nintendo decided to discontinue the production of *Nintendo 3DS* and not to release another handheld console, then that segment would be automatically substituted by that the hybrid ones.

This argument leads to answer the former question. As things currently stand, *Nintendo Switch* is in a position closer to the handheld segment than the home one. Unless other companies decide to try this new way, right now we cannot talk about a new segment created. It remains the possibility of the halfway niche, but that would result only if at the same time Nintendo (or another firm, even if this option is improbable) would decide to release a new handheld console alongside its hybrid console. However, the existence of *Nintendo Switch Lite* portends a future where there will be hybrid consoles supported by their entirely handheld versions (and, although is less likely, also entirely home versions). So, we can conclude that probably hybrid consoles are the evolution of handheld consoles and will substitute their segment.

6.4.3 Just one console for Nintendo?

If we try to understand the next managerial decision of Nintendo, we have to realise an important fact: *Nintendo Switch* could be the link between its two lines of consoles. In other words, if it is really also the successor of *Nintendo 3DS*, for the first time since the fourth generation Nintendo has just one console and not two to manage. It could seem obvious, but this has two crucial implications. The former is that it has no more diversification among consoles. The latter is that if in case the successor of *Nintendo Switch* was not successful, Nintendo would not have another console to rely on meanwhile it would fix the error.

Is it convenient for the firm to attempt this new strategy? On one hand, what mentioned above implies the risk to concentrate the future of Nintendo on just one console. If we also consider that the company operates exclusively in the video game field (in contrast to Sony and Microsoft that diversified their business portfolios), an error could lead to not insignificant consequences. On the other hand, it is also true that the company is entirely out of home consoles' competition. This reality was already actual at the time of *GameCube* and it is even more nowadays, so proposing a new home console could be in any case ineffective. However, at the same time offering a new handheld console alongside a hybrid one brings a high risk of cannibalisation. Another way could be to find a second clientele that is currently little represented in the market and presents her a console that would be positioned differently from both high-end range and *Nintendo Switch*'s successors. But the existence of such clientele is purely hypothetical and only market researches might find out the actual existence.

Whatever Nintendo will decide, there is a problem that it has to solve: releasing a new console not at the beginning but in the middle generation, out of phase from industrial cycles, could be dangerous. Third-party developers, indeed, when create new games, take into account consoles' characteristics, so having one that always falls behind a half generation is not ideal. However, the firm has declared the will to expand *Nintendo Switch*'s lifecycle beyond industry standards[148], so perhaps that it will return to usual paces with the approach to the tenth generation (skipping the ninth). It can also be that Nintendo is planning to develop its console independently to industrial cycles, but this implies strong support from third-party developers, especially when it will happen the transition to a new console.

[148] Makuch, Eddie (February 11, 2018). *Switch Lifecycle Could Extend Beyond The Typical 5-6 Year Window, Nintendo Says* . *GameSpot*. Retrieved 18 March 2020

6.5 Conclusions

Nintendo has definitely created its market position, far from the competition of hardware power. *Nintendo Switch* can rely both on a strong differentiation and its success, that permit to hold its clientele. No one can say what will happen in the future, but the company has shown resilience and capacity to reinvent itself, while remaining coherent and staying only in the video game industry. Whatever is coming, Nintendo and its "Nintendo Difference" will be ready.

Chapter 7 - Conclusions and Reflections

7.1 Two objectives, two conclusions

At the end of this journey into the world of video game industry and its leading players, it is necessary to summarise the two objectives of this work. The primary objective was to demonstrate that innovation has various forms and can be applied in various situations, the secondary one was to demonstrate how Nintendo has managed to maintain itself always in the field of video games for about 40 years.

Consequently, this paper presents two conclusions, one for each objective. After exposing them both, the author will share his concluding reflections.

7.2 Innovation as a multifaceted entity

The whole course of this work was marked by four innovations, in which we could see how they varied both in their nature and in their function in the context in which they were inserted. There has never been an innovation that was innovative in itself, but they all have responded to specific needs. An example is the first of them, the change of mentality caused by *NES*, which can be considered the most important and the most significant of all, because it has set an actual line of industrial thought that has become the main one. There was an urgent need to change relations and the way to approach industry, aware of what had happened in 1983. Innovation can, therefore, change not only production standards, but also mindsets and working methods.

In comparison, the other three are much less impacting, but that does not mean they are less important. The second innovation, the creation of handheld consoles with *Game Boy*, has however created a new segment of the market. Although in this case we are facing a simple product innovation, it shows that it is not necessary proposing something revolutionary to open new market opportunities. Sometimes, small improvements are enough to satisfy the potential needs of the clientele.

With *Wii (*the third innovation), the concept of opening to new possibilities expanded itself further. The new approach, determined by Blue Ocean Strategy, shows how innovation can be a way to go beyond the habitual clientele and explore potential until then ignored. This is probably the riskiest way to innovate, since nothing can ensure success. Nevertheless, if *Wii* itself proved how it can bring results, *Wii U* was the other side of the coin, demonstrating that it is not enough just having the right idea, but also is important to be able to handle it properly. Innovation, especially in its most extreme forms, also needs to be assessed in its long-term effects, or could become counterproductive.

As concern the last one, that is the creation of hybrid consoles with *Nintendo Switch*, being a newness of the market make it difficult how it has to be considered. However, if we assume that it is the evolution of handheld consoles, then we are facing an evolution of a previous novelty. What was once new and out of the box can become a standard to overcome. Innovation can surpass itself if progress, whether technological or cultural, allows it.

So, although in all four cases we started from a new console, the innovation led not only to new products, but also created different approaches to industrial production. We can conclude that innovation takes various forms, depending on the context as well as on companies and industry needs.

7.3 Nintendo's three winning cards

All things considered, three motivations have led to the survival of Nintendo during its approximately 40 years of activity in the industry. The first is the strong interconnection between its games and consoles, the second resides in the segment of handheld consoles and the third in its capacity for adaptation. We can also identify other factors, related to specific moments such as the bet won in winning over American consumers with *NES* or the speed of recovery from *Wii U*'s failure, but the three mentioned above are the most significant.

In the course of the work we have not deepened its software production, but without a doubt it contributed to its success. Nintendo has never been only a console developer, but also a software house, and has always made sure to have its games exclusively for its consoles (only recently it has opened to mobile market). Since most of them are high-quality products, the company not only had consistent revenues on the software side, but could connect them to the sales of its consoles. It could be argued that Sega also followed a similar strategy, however had to exit the hardware segment. What was the difference?

In the golden years of Sony, both Nintendo and Sega suffered its incredible success. Nevertheless, Super Mario's company had on its side the *de facto* monopoly of the segment of handheld consoles. If we think about it, there were two moments when that segment was crucial to its survival. In the period mentioned above, while *Nintendo 64* and *GameCube* were struggling to compete among the home consoles, *Game Boy* series dominated the handheld ones. *Nintendo 3DS* was crucial in the years of *Wii U*'s failure. What would have happened if during one of those times the company had not been supported from handheld consoles? Probably Nintendo would have followed the same fate as Sega and would have become just a software house.

Another reason for the success of Nintendo was its ability to adapt and innovate. This is true from the beginning, the company indeed has produced *hanafuda* for about seventy years, then it was a conglomerate and finally it focused solely in the field of video games. It took its risks in proposing *NES* in 1985, but succeeded in the enterprise and dominated the market for a decade. Then came Sony and Microsoft, and the firm instead of attempting direct competition preferred to deviate and to take on its own identity. It was the beginning of the "Nintendo difference" and its positioning as a company carrying values other than hardware power, in an opposite way to what he chose to do with *Nintendo 64* where instead he aimed to have the most powerful console.

In conclusion, its ability to resist over time is due to a mix of successful products, profitable long-term innovations (especially handheld consoles) and high adaptability and resilience.

7.4 End of a journey

At the end of this presentation, I would like to share some reflections that arose during the redaction. Writing a thesis on a topic like innovation was interesting, but focusing it on the world of video games was even more fascinating. Searching for pieces of information, giving them a coherent order and analysing them made me aware not only of how the gaming industry works, but also of how many decisions Nintendo had to make to become what it is now. At the same time, applying the concept of innovation and to examine everything from that perspective allowed me to understand a lot of things about it, such as how it can range from a simple market intuition to revolutionise industrial standards. The four innovations have led me to interpret not only their effects on the short term, but also on the long term, and how they have led to nowadays' industry.

Since the analysis of innovation and Nintendo's history went hand in hand, it is difficult for me to separate the two arguments. Of course, this shows that innovation is never an end in itself, but is functional to some corporate logic. For example *Wii* was a radical change resulting from the company's need to position itself from its competitors as far as possible. Not surprisingly, the two subjects were intertwined, since there has been no innovation that was not dependent on managerial decisions, and these were always related to market trends.

I think the most important consideration that I have made is that the two conclusions mentioned above are in fact strongly interconnected, and neither one could have happened without the other. Both for a mere question of historical events and openness to changes in mentality, the four innovations and the motivations of Nintendo’s success are actually part of a single scheme inseparable from both industrial dynamics and business decisions. I believe that this is the real point: the ability to innovate and try new ways always goes together with the need to attract customers and generate revenues.

The video game industry has changed deeply more than once in its history. I would not be surprised if, with the arrival of new technologies, further great news came. Can Nintendo face another radical change, such as the crisis of 1983 and the rise of Sony? I have no idea what the future will be like, but if there is one thing I have learned in this journey is that Super Mario's company has always found a way to reinvent and adapt itself to new industrial needs. So why would not do it again? Whether with a fifth innovation, or taking full advantage of its "Nintendo Difference", Nintendo will be able to defend its position as the oldest company in video game industry, and still has much to teach the others.

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Summary

Introduction: Innovation and video games

From the beginning of its history, humanity has needed to play: “game” has always taken on an educative and leisure function. No surprise if also in contemporary society "game" has been integrated perfectly in the system as "video game". This work is dedicated to innovation, and video game industry is ideal to talk about it. Above all, evolution of technological paradigms is so essential that its history is split into "generations". However, this paper will not take in consideration the usual technologic update, but four moments where there was an innovation that has led to relevant novelties. In particular, the focus will always target one of the principal firms, Nintendo. Since early eighties, this company has always occupied a relevant position in video game field. The four developments that will be examined have been generated from decisions at corporate/business strategy level taken by the firm.

This paper wants to achieve two objectives, one primary and one secondary. The primary is to demonstrate that innovation has many forms and it can be applied in many ways. Often we think that the only real innovation is that of the product, but we forget other typologies. The goal is to understand not only its various forms but also why it never exists for itself. The secondary objective is to show how Nintendo managed to remain always active in video game field for about 40 years. Since it is entered in this sector, it was and it continues to be the only big firm to have its business strategy entirely focused on video games. So, it will also be an opportunity to talk about decisions taken at business strategy level and their effects, both positives and negatives.

It is not possible understanding innovation without comprehending the context where it appears, and we will see events distant in time, that require each one an overview of industry's situation in every specific moment. Consequently, the author has decided to have a historiographical approach in the realisation of this paper. It will describe the history of video game from the beginning until present days, but it is not a complete description. The most significant events will be highlighted but they will be dealt in details only if it is necessary.

This paper is divided into seven chapters. Chapter 1 will provide base elements to understand the topic. It will talk about what “video game” mean, which is the history of Nintendo before its entry in video game market and what it has happened throughout the first two generations of the industry. Chapter 2 will talk about the third generation and how Nintendo, with the first innovation, has revolutionised the industry, while chapter 3 will debate about the fourth generation and the second innovation. Chapter 4 will be exclusively dedicated to dissertation of fifth and sixth generation, whereas chapter 5 will illustrate Nintendo's third innovation and about it has influenced the seventh and the first half of eighth generation.

Chapter 6 will debate about the second half of eighth generation, that is the current one, and the fourth innovation and, finally, in chapter 7 will draw the overall conclusions concerning the entire paper.

Chapter 1 - Beginning of video game industry

This chapter illustrates five essential topics to understand the whole work: what it is a video game, a brief description of Nintendo's history before its entering in the video game's market, the first two video game generations and the video game crash of 1983.

Video game and its industry

A "video game" is an electronic game in which players control images on a video screen. We can split the process into three primary parts: input peripherals, processors and output peripherals. Input peripherals are devices with which players interact with video games, processors run video games (that are, trivially, software) and interpret inputs to calculate outputs, and output peripherals are video screens. The industry is split into two fundamental parts: hardware and software. The former is dedicated to the development and commercialisation of video games' hardware, the latter to video games itself. Hardware industry can be split into two main sub-sectors, the first develop video games consoles and the second concern the development of PC's hardware explicitly designed to run video games (the so-called “PC Gaming”).

A brief history of Nintendo

Nintendo Co., Ltd (or just *Nintendo*) is a Japanese firm founded in 1889. It started producing *hanafuda*, the traditional Japanese playing cards, since 1963 when it abandoned the business and tried to diversify in many sectors. The only one in which it was successful was the Japanese industry of toys, but it struggled to keep pace with other companies in the sector. So, it decided to enter in the infant video game industry in 1974.

First video game generation

It is not simple to define when video game industry was born. There are many examples of video games since 1952, but the first typology to be commercialised in amusement arcades was the video games arcades category in late 1960s. However, the official year recognised to indicate the birth of gaming industry is 1972, due to two events that occurred in that year. In June 1972 was founded *Atari, Inc*, the first firm created with the intention to produce video games, and also the first relevant company in this

context. Then in September was launched on the market *Magnavox Odyssey*, the first video game console ever sold (from this moment we refer to them also as just "consoles"). With it, the first generation of consoles officially began. The main characteristics of consoles of that period, over to be the first ones ever created, lied to have all games within them. Some had one single game, other had many exchangeable ones with printed circuit boards.

In this period, Nintendo acquired rights to distribute Magnavox Odyssey in Japan in 1974. However, the most notable event was the hiring of Shigeru Miyamoto, that will have a crucial role in the development of the greatest successes of the firm.

Second video game generation

The passage from first to second console generation happened in January 1976, and the most sold console was *Atari Video Computer System* (then renamed *Atari 2600*) produced by Atari. The main innovation consisted in the ideation of ROM cartridges, that permit to not store data of a video game in a console but instead in an external memory card. Because of this change, it began the division process between hardware and software markets, officially started in 1979 with the creation of *Activision*, the first third-party video games developer. However, real protagonists were video games arcades and their golden age (1978-1982), in which appeared famous games like *Pac-Man* or *Donkey Kong*, the first commercial success of Nintendo.

Video game crash of 1983

In 1983, the gaming industry crashed. There are three causes, appeared in the previous years. First, an overflow of consoles production, that caused an excess of supply. Second, there was the proliferation of inexperienced third-party video games developers, that created too many bad quality games. Third, in those years was born the concept of "home computer" and consequently the market of home computer video games, and at that time they were more attractive than console both to developers and consumers (even if a price war rapidly destroyed the market). The three causes, together with market saturation, led to a quick prices drop and too many low quality games.

This caused a broad disinterest of customers and, consequently stores drastically decreased the number of video games on sales. Starting from June 1983, many companies close their doors, included Atari, that was sub-split in many companies (and we will discuss of the one that had the brand's rights, *Atari Corporation*).

The crash was not serious at a global level, because it affected only console video games in a period in which arcade video games were relevant and also is concerned only the North American market without influencing the Japanese one. However, it has generated the comprehension that the industry had to be managed in another way, especially with third-party developers and shifted the core of video games console industry from America to Japan. Due to this, the ground was prepared for the first main console of Nintendo.

Chapter 2 – Reviving an industry

The second chapter covers the third generation of video games, in particular in North America. It is focused on the role played by *Famicom*/*NES*, the decisions taken by the firm that has determined its success, and their implication on industry's future, generating one of the four innovations. It also describes the beginnings of Sega, the future main competitor of Nintendo.

Third video game generation

Video game's third generation began in 1983, when at the same time were released two consoles in Japanese market. One was Nintendo's *Family Computer*, commonly known as *Famicom*, the other one was Sega's *SG-1000*. Both of them were subjected changes in names when they were exported. Outside Japan, the former was commercialised as *Nintendo Entertainment System* (*NES*), the latter was renamed as *Sega Master System*. Another console worthy of mention of that period is *Atari 7800*, released in 1986 by Atari Corporation.

How NES conquered North America

Famicom was released in Japan in 1983 and became the most popular console in that country at the end of 1984. Nintendo decided to export the console in the U.S.A., but it had to recover the trust that consumers and retailers had lost after the crash, so it had to take some specific choices. After a change in design and renamed it as *Nintendo Entertainment System* (*NES*), it launched the console in 1985. In the marketing campaign was fundamental the bundle with *R.O.B.*, acronym of *Robotic Operating Buddy,* one of the most sophisticated controller ever created but disguised as a toy-robot. It was a marketing "Trojan Horse", because *NES'* marketing campaign was focused on selling console and videogames as toys. In just five years *NES* was owned by one in three American citizens, because Nintendo had understood that consumers were not tired of video games, but of pre-1983 bad video games.

However, *R.O.B.* was not enough. There were two problems to solve: the control over ROM cartridges production and the supervision of third-party developers. The former was solved by a total control of the production by Nintendo, with the support of a lockout chip. As concern the latter, Nintendo created a contract in which every software house that wanted to produce games for *NES* had to produce exclusively for the firm, and with a maximum of five games per year. For every game it had to order the production of at least 10.000 cartridges, cover the costs and take the risk to pay unsold inventories. Finally, every package had the *Nintendo Seal of Quality*, that guaranteed how games were original and approved by the firm. Furthermore, Nintendo self-produced high quality games, like *Super Mario Bros.*.

Why had Nintendo succeeded?

More than a single innovation, the success of *NES* was due to a series of changes. For example, the change of design or bundling the console with *R.O.B.*, commercialised as distant as possible from the concept of "video game". An apparently paradoxical choice, but more than justified in that period!

More crucial was the change in the approach that Nintendo established with the software market. Why was that change so important? Because the third generation has set a whole new standard in video games, especially in software market, that slowly conducted to the nowadays industry, which is similar to the ones of films or books. Many are the factors that have led to this situation, but the beginnings of all this process was in the decisions that Nintendo took in North America in the eighties. For this reason the first innovation, the change in relationship with software houses, is the most important: it has revolutionised the mentality of an entire industry.

Was *NES* a risky move? Surely it was not the safest path to take proposing it to North America, but the company was successful to recover the trust lost after the crash of 1983. At the same time, it has understood how the support of third-party developers was necessary to promote its console. However, it was aware that it had not to give too much freedom, so it created a very severe contract. We have also to remember that Nintendo itself had talents in the creation of video games. Therefore, this explains how *NES* (and *Famicom*) had so many successful games.

First steps of Sega

Even if Atari Corporation attempted to revive the Atari brand with *Atari 7800* in North-America, it was doomed to decline, and at the same time another firm was emerging. That firm was *Sega Enterprises, Ltd* (or just *Sega*). Founded in Japan in 1960, in its early years of business, the company contributed to the birth of arcade video games and it was one of the principal firms throughout the golden age. In 1982 that age finished, so in 1983 it decided to enter the business of Japanese video game consoles with *SG-*

1000 (then improved in 1985 and re-released as *Sega Mark III*). It exported the console as *Sega Master System* in North America in 1986, but due to the great success of Nintendo it targeted European and Brazilian markets, respectively in 1987 and 1989, in which it sold more than *NES*.

Although its actions in the third generation were not particularly remarkable, Sega has contributed to the diffusion of video games on a global scale and his entrance in console's world was preparing the ground for the fourth generation and its rise as the main competitor of Nintendo.

Chapter 3 – Birth of handheld consoles

The third chapter describes the fourth generation and part of the fifth generation. The main topic is the separation in the industry between "home consoles" and "handheld consoles", the last one are the second innovation.

Fourth video game generation

The fourth generation officially started in October 1987, and the two relevant home consoles of that period were Sega's *Mega Drive* (known in North America as *Sega Genesis* or just *Genesis*) and Nintendo's *Super Nintendo Entertainment System* (or just *SNES*). In North America, *Mega Drive* was launched in 1989 with a very aggressive marketing campaign. So, when *SNES* was released in 1991 is started the first "console war", a term utilised in industrial jargon when two or more consoles are at trade war each other. It is not clear who was the winner, so we can say that the "war" finished in a draw. Meanwhile, arcade games were declining and PC games were slowly coming back, but these two markets had influenced the industry in those years just a little.

Beginnings of handheld consoles

Even if there were some examples in the second generation, handheld console appeared in 1989 with Nintendo's *Game Boy*, followed by three competitors (included Atari Corporation and Sega). Although the console had lower performances, whereas the competitors sold in total about 13 million units, *Game Boy* (along with its following version *Game Boy Color*) sold about 140 million. We can identify three primary motivation in its success. The first lay in its price, lower than its competitors. The second was the battery life: the focal point of handheld consoles is the possibility to take them anywhere, and while the other consoles had a battery life in a range of two-six hours, *Game Boy*'s one lasted about forty hours. The third was the bundle with the popular game *Tetris*, that targeted a clientele broader than the habitual one.

The console had a second life in 1996. Despite it was at the end of its lifecycle, it was revitalised by the game *Pocket Monster* (commonly known as *Pokémon*) that had a huge worldwide popularity. So, in 1998 Nintendo released *Game Boy Color*. Although it was theoretically *Game Boy*'s successor, in practice the new features were just a little more powerful hardware and a colour display. So it is generally considered as just a better version of *Game Boy*.

Why was Game Boy so successful?

Handheld consoles are innovative because they are a different way to approach video games. If a home console requires television and a power plug, a handheld one requires only some charged batteries and it can be carried everywhere. Considering that *Game Boy* was not the only handheld console in that period, why was it such a success? Among the three reasons explained above, probably the most important was that all competitors had excessive energy absorption as a common problem, because in a handheld console is important a right balance between performance and energy consumption. Hard to tell if Nintendo's engineers had intuited this rule or it is was just a consequence of having designed a low power console.

It is a product innovation that has led to the birth of a new segment, in which Nintendo always has been dominant. Thanks to a combination of company policies, the firm is the *de facto* monopolist of handheld consoles. This had brought benefit to the company at any time, even when home consoles' sales were not excellent.

Game Boy was successful especially for the issue of electrical energy consumption, but it hard to say that the design of a low power console was a deliberate choice or a stroke of luck. In any case, it was surely a deliberate choice selling *Tetris* bundled with *Game Boy*. The investment in the *Pokémon* project was, conversely, a company's intuition. A winning bet that led to *Game Boy*'s second life, *Game Boy Color*, and the creation of one of bestseller series of Nintendo's handheld consoles.

Chapter 4 – Turnover of competitors

Since the third innovation took place in the seventh generation, it is necessary to fill the time frame of the fifth and sixth. Therefore, these two generations are the main topics in Chapter 4.

Fifth video game generation

The fifth generation started in October 1993, and the principal novelty of this generation was the introduction of CD-ROMs as standard for the diffusion of software in place of ROM cartridges, that brought significant improvements, such as a more extensive data storage capacity and lower costs for consoles' producers. The main competitors released their console between 1993 and 1996, but it was a new one that the command on the home console market.

It was *Sony Corporation* (or just *Sony*), a conglomerate firm founded in Japan in 1946, known mainly for its businesses in entertainment and electronics. It entered in video game industry in 1985, when it created a joint venture with Nintendo for a project failed in 1992. Nevertheless, it used the expertise acquired to create its console, *PlayStation*, that was released in 1994. It was an incredible worldwide success, that overshadowed Sega's *Sega Saturn* that was released just a week before.

As concern Nintendo, it had a couple of commercial failures in early 1990s, and it started to recover in 1996. In that year it was released *Pokémon* and the new home console *Nintendo 64*, that despite the arrival of CD-ROMs used cartridges (in order to prevent software piracy, that was easier on CDs). However, this choice forced to rely mainly on its games because many third-party developers preferred Sony. *Nintendo 64* was the second console most sold in that generation, *Sega Saturn* had good sales only in Japan and the last console of Atari Corporation, *Atari Jaguar*, was so disastrous that the company exited the hardware market.

Sixth video game generation

Consoles of sixth generation were released between 1998 and 2001. It was without a doubt Sony's moment of glory, because its *PlayStation 2* was even more successful than its predecessor. It sold about 100 million units, whereas its three competitors sold together about 56 million units. The second competitor in sales was a new entry, *Microsoft Corporation* (or just *Microsoft*), an American firm founded in 1975 known primarily for its operating system Windows. Although its entrance in the video game world had already happened as a publisher of successful PC Games, it released its console *Xbox* in 2001, which had multiplayer online game as the main feature.

Nintendo was third in sales, because its *Nintendo Gamecube* was not able to face *PlayStation 2*, however in handheld console sector it continued to dominate with its new console *Game Boy Advance* (2001). Lastly, Sega's *Dreamcast* had the worst sale in that generation and forced the firm to discontinue its production very early in 2001. Since then, the company had produced no more consoles and it focused on producing video games as a developer.

Chapter 5 – How to navigate in a blue ocean

Due to the last two generations, that had radically changed the scenario in the home console sector, Nintendo decided to change completely approach in the industry. This change, that is the third innovation, and its effects both on seventh and eighth generation are described in this chapter.

Seventh video game generation

The seventh generation began with handheld consoles in 2004 with *Nintendo DS* and Sony's *PlayStation Portable*. It was the only time in the history of the segment that a "console war" took place, but Nintendo continued to keep its leadership position. Regarding the home console segment, between 2005 and 2006 there were three competitors: Microsoft's *Xbox 360*, Sony's *PlayStation 3* and Nintendo's *Wii*. The strategies of the first two consoles were actually somewhat similar, both focused on hardware performance and graphics, but the third one has a new market approach, a third innovation that led to win the "console war" of that generation: Nintendo had successfully navigated in a blue ocean.

How Wii took advantage of video games' blue ocean

With "blue ocean" we are referring to the "Blue Ocean Strategy". To explain it is used a metaphor in which we can imagine the market as an ocean, with companies that compete in a specific section, that one where profits are high. Consequently, due to the trade war there is a bloody red ocean, hence a competition strategy is denominated Red Ocean Strategy. However, this implies that there are other sections in the ocean in which there is not a competition and the water is still blue. The Blue Ocean Strategy involves exploring those waters, to discover unexpressed potential of own industry and to take advantage of the absence of competition. *Wii* has become an actual textbook case of this subject, and then this paper wants to discuss the console in a way slightly different from usual, because at this point we are aware of the context in which *Wii* competed and we will not analyse only the seventh generation's background, but also will examine the effects that it caused on Nintendo in the following generation.

With *Wii*, the point was not more to compete with Sony and Microsoft, but to attract new clientele. The focus was not to target customers inside the market but "noncustomers", that Blue Ocean Strategy defines as potential buyers that are outside it. In the video game market, an "usual" customer has 18-35 years (about 50% of the players are in that age range). Accordingly, *Wii* targeted clients younger and older than the main range. If we try to visualise it, we can see as a reference model a family, with parents, children/young teenagers, even grandparents.

In order to achieve this, it had to be innovative also from a technical point of view. Its primary controller, *Wii Remote*, combined keystrokes with the movement of the controller itself allowing the console to calculate its position in the 3D space. The main games required to imitate the movement of real objects like rackets and clubs. There was not just a matter of movement opposed to the sedentariness of a usual controller, but also the immediacy in learning commands. So, it was more accessible to people that were not accustomed to video games.

Eight video game generation

The eighth video game generation is the current one and continues nowadays. It is begun in 2011 in handheld console sector with *Nintendo 3DS* and Sony's *PlayStation Vita*. The former dominates the market and is still in production, the latter was a failure and it was discontinued in 2019. Regarding home console segment, starting from November 2012 were released Nintendo's *Wii U*, Sony's *PlayStation 4* and Microsoft's *Xbox One*. Furthermore, there was a fourth console produced by Nintendo: *Nintendo Switch*, released in 2017. We will discuss about pieces of information regarding the home console sector in the next chapter, for now we have only to know that *Wii U* was a commercial failure with about 13 million units sold, to be compared with *Wii* and its 100 million units. The long term effect on the company of *Wii*'s success was the failure of its successor, but why?

Why Wii U was a failure?

Wii was a console that mainly targeted "casual players", a term in industrial jargon to refer to those that occasionally play without particular interest, but this moved away the habitual "heavy players". The consequence was that the console was positioned differently from the others. However, this generated a fundamental problem. One of industry's primary dynamics is the generational transition from a console to another one, in which firms try to attract as many players as possible to buy new consoles, whereas *Wii* targeted a clientele that was not interested in the process. Nintendo noticed it and tried to position *Wii U* as a console dedicated to passionate players, but arrived a series of problem such as weak performances

and limited support by third-party developers. In the end, the console was a failure and it was discontinued in 2017 just before the release of its successor *Nintendo Switch*.

Wii e Wii U, two sides of the same coin

How can we judge a strategy that we could define as a clientele innovation or even as an approach innovation? A similar strategy is without a doubt a risk, because it is based on the exploration of potential clientele whose reactions are virtually unknown. Nintendo found hidden values that were actually sought after by a part of potential customers. Otherwise, we could not explain the success of *Wii*. Nevertheless, if this attracted "causal players", it also repulsed "heavy players", and this fact was evident with the generational transition, where the console had a clientele that was not interested in buying a new one. The strategy in long term had worked against the firm itself, that had to propose a console without a precise market target.

This reflection leads us to a question: can Blue Ocean Strategy be applied with success in the video game industry? In order to answer it, we have to consider that this industry has always counted on customers' loyalty, that passes from console to console especially due to series. *Wii* instead has created a new clientele and new brands, but it had positioned the console in a manner that did not create customer loyalty in the long term. This does not imply that Blue Ocean Strategy is an incompatible strategy, but it is a very risky and implies to plan both on short and long term strategies.

Despite what we have observed, Nintendo was right to try Blue Ocean Strategy. The firm's decline was due to *PlayStation* and *PlayStation 2*, that had defeated its consoles in terms of popularity and hardware. What was *Wii* if not the awareness that Nintendo was forced to try another way in the home console sector? Regarding the seventh generation, the company made exact choices to identify noncustomers and created products that attracted them. Troubles came with the next generation. If we want to identify the fundamental problem, it lay in the bad management of *Wii U*. It had already a disadvantage because it had to attract both *Wii*'s customers and fans of Nintendo's franchises, but it failed both goals. Coming back in Red Ocean competition was a severe mistake, because it should have focused on the not easy task to maintain loyal the clientele generated with *Wii*.

Chapter 6 – Toward a hybrid future

This chapter, after describing the remaining part of the eighth generation, has as main subject the description of Nintendo recovery from *Wii U* through *Nintendo Switch*, its fourth and final innovation.

Current situation of industry

Between 2012 and 2013 three consoles have been released: *PlayStation 4*, *Xbox One* and *Wii U*. Due to the failure of the last one, Nintendo in the middle of eighth generation released in 2017 a new console, *Nintendo Switch*. This has caused some doubts regarding if it is an eighth or a ninth generation console, but is generally considered in the first category. However, home consoles are not the only sector to discuss about. During the last two generations, other two markets are appeared in the video game field: PC Gaming and mobile.

The former has always existed but since the crash of 1983 has always remained in the background, but in the last decade the exponential technological progress of PCs power has made their performances better than consoles itself. So, the world of "PC Gaming" is become an actual competitor of Sony and Microsoft. As concerns the latter, the sector is composed mainly to small free-to-play games, and curiously the first big company that had taken an interest in this segment is Nintendo, that has released games starting from 2016.

Consoles' third way

Nintendo Switch is the first "hybrid" console, that means that it is at the same time a home and a handheld console, and players can connect it to a television through a dock, or carry it around using its internal batteries. Keeping itself away from the main competition, it has created its market segment conscious that its console is less powerful than the others but has the uniqueness to be hybrid. This main trait has raised perplexity, because it is surely the replacement of *Wii U*, but it is not clear if it is also the successor of *Nintendo 3DS*. On one hand, its production has been confirmed for this year, on the other hand, it has been released *Nintendo Switch Lite*, an exclusively handheld version. Probably only an official announcement from Nintendo will give us an answer.

Nintendo Switch and the future of industry

Like *Wii*, the success of *Nintendo Switch* is based on a mixture between a technical innovation and an innovative approach. Regarding the approach, the console is considered as a continuation and application of that Blue Ocean Strategy that made the success of *Wii*, and some argue that Nintendo would have started that approach since the days of *Game Boy*. Although the argument has some solid foundation, both *Game Boy* and *Nintendo Switch* require some reflections. Regarding the former, we have to remember that Nintendo from the beginning was implementing a cost approach to cut the price in order to intercept a price-sensitive clientele, but this alone is not enough to claim that it was a Blue Ocean Strategy. Besides, the will to differentiate through "Nintendo Difference" started in the sixth generation, not throughout the fourth one.

As concern *Nintendo Switch*, it is positioned in a lower price range, focusing on the "differentiation factor" and staying away from the competition. However, at the same time it is not targeting "noncustomers", but it is intercepting those players that are more price-sensitive and searching other characteristics beyond performances, even if it can be considered as a successor of *Wii*'s innovative philosophy.

Has an innovation like a hybrid console created a new market, or a sort of halfway niche? Considering that Nintendo is the monopolist of handheld consoles, are hybrid consoles their evolutions? Let us start with the latter question. *Nintendo Switch* tries to be an equilibrium point to offer an experience similar to both home and handheld console, but it cannot be the link between the two sectors because the problem of electrical energy consumption returns. So, the hybrid console is after all a handheld device that can be used with a television. But this implies that it would actually be the evolution of handheld consoles.

This argument leads to answer the former question. As things currently stand, *Nintendo Switch* is in a position closer to the handheld segment than the home one. Unless other companies decide to try this new way, right now we cannot talk about a new segment created. It remains the possibility of the halfway niche, but that would result only if at the same time Nintendo would decide to release a new handheld console alongside its hybrid console. So, we can conclude that probably hybrid consoles are the evolution of handheld ones and will substitute their segment.

If *Nintendo Switch* is also the successor of *Nintendo 3DS*, for the first time since the fourth generation Nintendo has just one console and not two to manage. Is it convenient for the firm to attempt this strategy? On one hand, there is the risk to concentrate the future of the firm on just one console. On the other hand, it is also true that the company is entirely out of home consoles' competition. Whatever

Nintendo will decide, there is a problem that it has to solve: releasing a new console not at the beginning but in the middle generation, out of phase from industrial cycles, could be dangerous, so the company has to return to the usual pace somehow.

Chapter 7 - Conclusions and Reflections

This paper has two objectives: the primary objective was to demonstrate that innovation has various forms and can be applied in various situations, the secondary one was to demonstrate how Nintendo has managed to maintain itself always in the field of video games for about 40 years. Consequently, this paper presents two conclusions, one for each objective, and concludes with some reflections of the author.

Innovation as a multifaceted entity

The whole course of this work was marked by four innovations, in which we could see how they varied both in their nature and in their function in the context in which they were inserted. An example is the first of them, the change of mentality caused by *NES*, which can be considered the most important and the most significant of all, because it has set an actual line of industrial thought that has become the main one. Innovation can, therefore, change not only production standards, but also mindsets and working methods. The second innovation, the creation of handheld consoles with *Game Boy*, has created a new segment of the market. Although in this case we are facing a simple product innovation, it shows that it is not necessary proposing something revolutionary to open new market opportunities.

With *Wii (*the third innovation), the concept of opening to new possibilities expanded itself further. The new approach shows how innovation can be a way to go beyond the habitual clientele and explore potential until then ignored. Nevertheless, if has proved how it can bring results, *Wii U* was the other side of the coin, demonstrating that it is not enough just having the right idea, but also is important to be able to handle it properly. As concern the last one, that is the creation of hybrid consoles with *Nintendo Switch*, if we assume that it is the evolution of handheld consoles, then we are facing an evolution of a previous novelty. Innovation can surpass itself if progress, whether technological or cultural, allows it.

So, although in all four cases we started from a new console, the innovation led not only to new products, but also created different approaches to industrial production. We can conclude that innovation takes various forms, depending on the context as well as on companies and industry needs.

Nintendo's three winning cards

Three motivations have led to the survival of Nintendo during its approximately 40 years of activity in the industry. The first is the strong interconnection between its games and consoles, the second resides in the segment of handheld consoles and the third in its capacity for adaptation. In the course of the work we have not deepened its software production, but without a doubt it contributed to its success. Nintendo has always made sure to have its games exclusively for its consoles. Since most of them are high-quality products, the company not only had consistent revenues on the software side, but could connect them to the sales of its consoles. Above all, handheld consoles were crucial to its survival during the fifth and sixth generation, and during *Wii U*'s failure.

Another reason for the success of Nintendo was its ability to adapt and innovate. It has changed from *hanafuda* to video games, and after *NES* it dominated the market for a decade. When Sony and Microsoft came, the firm instead of attempting direct competition preferred to deviate and to take on its own identity as a company carrying values other than hardware power.

In conclusion, its ability to resist over time is due to a mix of successful products, profitable long-term innovations (especially handheld consoles) and high adaptability and resilience.

End of a journey

Writing a thesis on a topic like innovation was interesting, but focusing it on the world of video games was even more fascinating. Searching for pieces of information on how the gaming industry works, and at the same time applying the concept of innovation, allowed me to understand a lot of things about them. For example, I learned that innovation is never an end in itself, but is functional to some corporate logic. Not surprisingly, the two subjects (the analysis of innovation and Nintendo's history) were intertwined, since there has been no innovation that was not dependent on managerial decisions. I think the most important consideration that I have made is that the two conclusions mentioned above are in fact strongly interconnected, and the real point is that the ability to innovate and try new ways always goes together with the need to attract customers and generate revenues.

I have no idea what the future will be like, and if with the arrival of new technologies Nintendo will face another radical change. However, the company has always found a way to reinvent and adapt itself to new industrial needs, so in all probability it will be able to defend its position as the oldest company in video game industry, and still has much to teach the others.