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GROWTH AND FUTURE OF VIDEO GAME INDUSTRY

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ABSTRACT

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The idea for this thesis came from personal interest and knowledge in gaming, video games and video game industry, with the support of long history of gaming and its still growing popularity. This thesis will focus on game consoles and PC's as a platform and their respective games.

The objective of this thesis is to look at game industry in general, where it started and how it got to the state it is in now, with some areas being more in-depth. One of the goals is to find out if game industry has affected IT development, specifically hardware development, and how hardware could change in the future along with the game industry. Also taking a look into the future of game distribution and game platforms.

This thesis is useful for someone who wants a brief overview of game industry's history and would like to see some thoughts about the future.

Keywords: video games, games, development platforms, gaming, information technology

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1 INTRODUCTION

The history of video games goes as far back as the early 1950s, when academic computer scientists began designing simple games and simulations as part of their research or just for fun. At M.I.T. in the 1960s, professors and students played games such as 3D tic-tac-toe and Moon Landing. These games were played on computers such as IBM 1560, and punch cards were used to make moves in the games. (Wikipedia 2019, cited 9.3.2019.)

Video gaming reached mainstream popularity in the 1970s and 1980s, when arcade games and gaming consoles utilizing joysticks, buttons and other controllers, along with graphics on computer screens and home computer games (PC games) were introduced to the general public. One of the first games was Spacewar! which was developed by computer scientists. The timeframe for early arcade games was from 1972 to 1978. (Wikipedia 2019, cited 9.3.2019.)

This thesis focuses on video games and gaming industry in general, but also looks into the possible effects esports has had on the industry and how game development has changed and how the game industry has affected hardware development in the past 10 to 15 years. The thesis also takes a little peek into the possible futures of video game distribution and platforms. The timeframe for future predictions is 5 to 10 years. Mobile gaming will be excluded from this thesis since the thesis has a main focus on console and PC gaming.

2 SHORT HISTORY OF VIDEO GAME CONSOLES

The first generation of home consoles emerged in the 1970s, which included the popular Pong game and various “clones”. 1970s was also the era of mainframe computer games. The years between 1978 and 1982 was considered the golden age of arcade video games. (Wikipedia 2019, cited 9.3.2019.)

Malls housed video arcades that had large, graphics-decorated coin-operated machines which were popular, but also affordable home consoles were introduced, such as the Atari 2600 and Intellivision, and they enabled people to play games on their home TVs. (Wikipedia 2019, cited 9.3.2019.)

During the 80s, gaming PCs, early online gaming and handheld LCD games emerged; this era was affected by the video game crash of 1983. From 1976 to 1992, the second generation of video consoles emerged, including Atari 2600 and Intellivision, see figure 1. (Wikipedia 2019, cited 9.3.2019.)



FIGURE 1. Intellivision and Atari 2600

The third generation, or 8-bit era, of consoles, which were 8-bit units like the Nintendo Entertainment System, more commonly known as NES, and Sega SG-1000; emerged from 1983 to 1995, see figure 2. (Fahs 2012, cited 9.3.2019.)



FIGURE 2. NES and Sega SG-1000

Fourth generation of consoles were 16-bit models, like the Sega Genesis and SNES (Super Nintendo Entertainment System), see figure 3, presented themselves from 1987 to 1999. During these years the first notable handheld consoles were also introduced, Nintendo's Game Boy and Sega's Game Gear, see figure 4. (Wikipedia 2019, cited 9.3.2019.)



FIGURE 3. SNES and Sega Genesis



FIGURE 4. Sega Game Gear and Nintendo Game Boy

The 90s saw the resurgence and decline of arcades, the transition to 3D video games, improved handheld games, and PC gaming. (Wikipedia 2019, cited 9.3.2019.) The 1990s was the turning point of video game industry. Technology evolving allowed games to transition from simple 2D platformers to exquisite 3D experiences.

Fifth generation of consoles were 32 and 64-bit units emerged from 1993 to 2002. During this era, mobile phone gaming also emerged. (Granett 2000, cited 9.3.2019.) Most popular consoles of this era were the Sony PlayStation, Nintendo 64 and Sega Saturn, see figure 5. Most notable handheld console of this generation was Nintendo's Game Boy Color. (Wikipedia 2019, cited 9.3.2019.)



FIGURE 5. PlayStation, Nintendo 64 and Sega Saturn

The sixth generation of consoles emerged from 1998 to 2013. During this era, online gaming and mobile games became major aspects of gaming culture. (Wikipedia 2019, cited 9.3.2019.) Consoles including Sega Dreamcast, Sony PlayStation 2, Nintendo GameCube and Microsoft Xbox were the biggest stars of this era, see figure 6. Handheld consoles, like Game Boy Advance and Nintendo DS, were also introduced during this generation. (Wikipedia 2019, cited 9.3.2019.)



FIGURE 6. Dreamcast, Xbox, GameCube and PlayStation 2

Seventh generation of consoles were from 2005 to 2012 (Wikipedia 2019, cited 9.3.2019). These consoles included Microsoft's Xbox 360, Sony PlayStation 3 and Nintendo Wii, see figure 7. (Wikipedia 2019, cited 9.3.2019.) This era was marked by huge development budgets for some games, with some having cinematic graphics; the launch of the top-selling Wii console, in which the user could control the game actions with real-life movement of the controller; the rise of casual PC games marketed to non-gamers and the emergence of cloud computing in video games. (Wikipedia 2019, cited 9.3.2019.)



FIGURE 7. Xbox 360, PlayStation 3 and Wii

Each new console introduced a new type of breakthrough in technology: Xbox 360 could play games rendered natively at high-definition video (HD) resolutions; PlayStation 3 offered HD movie playback via a built-in 3D Blu-ray disc player; while Wii focused on integrating controllers with movement sensors as well as joysticks. (Wisniowski 2006, cited 9.3.2019.) By this generation, video game consoles had become an important part of the global IT infrastructure. (Wikipedia 2019, cited 9.3.2019.)

In 2013, the eighth and current generation of consoles emerged, including Nintendo's Wii U and Nintendo 3DS, Microsoft's Xbox One, Sony's PlayStation 4 and PlayStation Vita, see figures 8 and 9. PC gaming has been holding a large market share in Asia and Europe for decades and continues to grow due to digital distribution. Since the development and widespread consumer use of smartphones, mobile gaming has been a driving factor for games, as they can reach people formerly uninterested in gaming, and those unable to afford or support dedicated hardware, such as video game consoles. (Wikipedia 2019, cited 9.3.2019.) Even though video game consoles are fairly affordable. Higher-end smartphones cost hundreds more than a video game console.



FIGURE 8. PlayStation 4, Xbox One and Wii U



FIGURE 9. PS Vita and Nintendo 3DS

2.1 Popular games of each generation

1st generation didn't have the best variety of games available. Games like Pong and Telstar series were pretty much the only games available for consoles. Telstar series included sports games like hockey, handball and tennis. (Wikipedia 2019, cited 10.3.2019.) See figure 10.

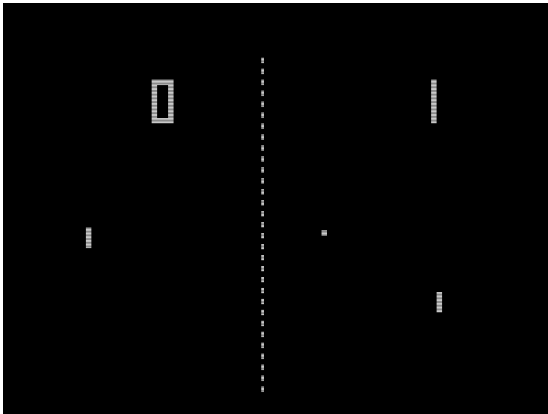


FIGURE 10. Pong

2nd generation picked things up a bit. The home console games were considered as “ports” of arcade games, which was a thriving sensation during the 2nd generation era. Games like Donkey Kong, Space Invaders and Pac-Man were very popular. (Wikipedia 2019, cited 10.3.2019.) See figure 11.



FIGURE 11. Pac-Man

3rd generation ended the North American video game crash and the dominance of home video games shifted from the United States to Japan. This generation gave birth to many long-lasting game titles that are very popular, even today, like Castlevania, Dragon Quest, Final Fantasy, The Legend of Zelda, Mega Man, Metal Gear, Kung Fu, Metroid and Super Mario Bros. (Wikipedia 2019, cited 10.3.2019.) See figures 12 and 13.



FIGURE 12. *The Legend of Zelda*



FIGURE 13. *Kung Fu*

4th generation was the era of Sega, their new franchise, Sonic the Hedgehog, was a huge success and managed to compete with Nintendo's Super Mario series. Other notable games were Chrono Trigger, FIFA International Soccer, John Madden Football, Prince of Persia, Mortal Kombat and Street Fighter. (Wikipedia 2019, cited 10.3.2019.) See figure 14.



FIGURE 14. *Prince of Persia*

5th generation included the transition from 2D games to 3D, which brought new possibilities to games. Popular titles were Crash Bandicoot, GoldenEye 007, Gran Turismo, The Need for Speed, Resident Evil, Tekken and Tomb Raider. (Wikipedia 2019, cited 10.3.2019.) See figure 15.



FIGURE 15. *Crash Bandicoot*

6th generation continued the success that 5th generation had set. Games evolved by a significant margin in quality. Games like God of War, Grand Theft Auto, Half-Life, Shadow of the Colossus and SoulCalibur were highly sought after. (Wikipedia 2019, cited 10.3.2019.) See figure 16.



FIGURE 16. *Grand Theft Auto San Andreas*

7th generation had already blooming PC gaming, but consoles were not that far behind. Graphics got a lot more realistic which attracted a lot of players. Titles such as Assassin's Creed, Batman: Arkham Asylum, Bayonetta, BioShock, Dark Souls, Gears of War, The Last of Us, Mass Effect, Uncharted series, Red Dead Redemption and Portal are worth mentioning. (Wikipedia 2019, cited 10.3.2019.) See figures 17 and 18.



FIGURE 17. *Assassin's Creed*



FIGURE 18. Uncharted: Drake's Fortune

8th generation has definitely been more of a PC gaming era, but consoles are still widely popular. There is a constant argument war about which consoles is better, PS4 or Xbox One, although many think that PC is absurdly superior to both. Which is true. PC has customizability and a wide variety of components that consoles just don't have which leads to higher performance and better-looking quality in games. Today one can purchase a decent used gaming PC for the same price they would have to pay for a console, new custom-built PCs cost a lot more of course but offer better performance. There is also a lot more free games on PC and you don't need a monthly subscription to play online, unlike PS4 and Xbox One require an active subscription to play online. Popular titles currently are Playerunknown's Battleground, Fortnite, Apex Legends, Counter-Strike: Global Offensive, Kingdom Hearts series, The Witcher 3, Overwatch and many, many others. See figures 19, 20 and 21.



FIGURE 19. PlayerUnknown's Battlegrounds



FIGURE 20. Fortnite



FIGURE 21. Kingdom Hearts 3

It is no surprise that the age of 9th generation consoles is soon to be here. Technically it has already started. Nintendo Switch is technically a 9th generation console as it is a unique hybrid of home and portable console. But the real start of the 9th generation could be when the next PlayStation and Xbox are launched. (Williams 2018, cited 21.4.2019).

The next devices from Sony and Microsoft are expected to be seen in 2020. There are numerous directions this generation can go. Will we see more powerful hardware, continuing to push 4K gaming as the growing standard? If that's the case, that hardware will be an ongoing evolution of the current generation and a complete jump with unique infrastructure. (Williams 2018, cited 21.4.2019).

It would not be a complete surprise if virtual reality was a major component for the next generation consoles. Some hardware manufacturers and technology companies are building standalone headsets focused purely on virtual reality or augmented reality. (Williams 2018, cited 21.4.2019). This generation will likely see the launch of several streaming consoles, even if they are not coming from any of the major home console owners (Williams 2018).

2.2 Improvements from generation to another

The first consoles were very primitive by today's standards and were very "bulky". The first video games did not even have sound, maybe because the films at the time did not have sound either or the consoles were not capable to transfer sound to a TV. From 1976 to 1977 the consoles started to get more modifications to controllers and the games got modifications to graphics and digital on-screen scoring. (Poh 2018, cited 4.4.2019.)

During the 80s the industry started to experiment with non-Pong games like fighting, platform, adventure and RPG games. This era also saw the release of all-time classic games like Pac-Man, Mario Bros, The Legend of Zelda, Final Fantasy, Golden Axe, etc. The technology used in the consoles also evolved from dedicated consoles, with built-in games, to cartridge-based video game systems. (Poh 2018, cited 4.4.2019.)

In the 90s the cartridge-based system shifted to compact discs, which meant increased capacities for video gaming, prompting as well as a transition of 2D graphics to 3D. (Poh 2018, cited 4.4.2019.) Every generation of consoles were more evolved than their predecessor pretty much in every aspect possible. Graphics were better with every console as well as the technology used, for example storage, went from none available to separate memory cards and finally internal storage with the possibility to add external storage. Consoles of later generations are of course far more popular the older ones and this can be seen from the sales numbers. However, a couple of older hand-held consoles, Game Boy and Game Boy Advance, have managed to crawl their way into the top 10 best-selling consoles of all time, as seen in figure 22. (Jurkovich 2018, cited 4.4.2019.)

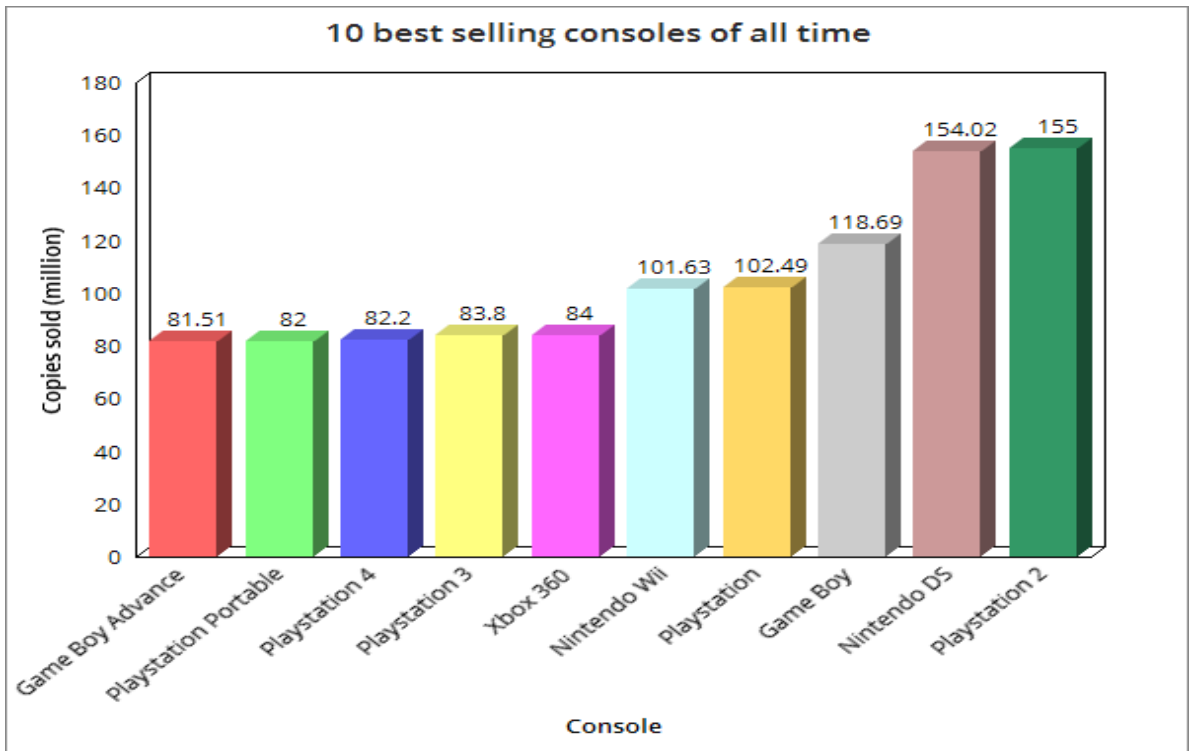


FIGURE 22. 10 best-selling consoles of all time (Jurkovich 2018, cited 4.4.2019)

3 GAMES NOW

Games nowadays have a big focus on graphics since the younger generation of gamers care about it the most, which is understandable, because they were not around when 8-bit and 16-bit games ruled the markets. The older generation of gamers appreciate other aspects in a videogame, like immersion, the story and playability. Good graphics is just a plus among the other good qualities.

In the past few years a lot of game developers put most of their focus on multiplayer modes, especially in first-person shooter games, and they'll end up not doing a singleplayer mode at all. Most recent example would be Call of Duty Black Ops 4, which only has multiplayer mode and a battle royale mode, which became an incredibly popular genre after the success of Playerunknown's Battleground, which is a stand-alone battle royale game made to resemble the battle royale mod for ARMA II, which was also created by Playerunknown.

According to recent sales figures, physical copies of games are dwindling. The turning point for sales was in 2013 when 54 percent of games purchased were digital compared to 46 percent being physical. In 2016 games purchased digitally already had 74 percent of the sales compared to 26 percent for the physical copies. (Daws 2017, cited 19.3.2019.) Buying games digitally is much more convenient than getting a physical copy, especially in console gaming. On console one would have to change the game disc if they wanted to switch games if they have the physical copy. Purchasing digitally removes that need, games are installed directly to the console's hard drive and therefore don't require a disc to run. Consoles nowadays have so much internal storage that they can store dozens of games. And if someone might require more space, consoles have the compatibility with external hard drives.

Video game marketing has changed drastically over the years. Before it was advertisement in specialized magazines or stores. Now it is open betas, companies paying streamers to play their game on stream in front of an audience, medium or large, smaller streamers usually don't get paid to advertise a game on their channel. Some companies might even give out their games for free for a limited time, such as Psyonix did with their hit title Rocket League, which was free for a month to PlayStation Plus members and it remains free for the members as long as their subscription is active.

Multiple game titles in the past 3 to 5 years, that are free to play, have become very popular. There's a very simple, yet controversial, way for these free games to make money and that is microtransactions. Microtransactions are a paid feature in a, often, free game. Most of the time they offer different cosmetic appearances via microtransactions that don't affect gameplay and keeps the game fair for everyone. Some games, however, offer an unfair advantage via microtransactions, or MTX, which makes the players very dissatisfied and some people even avoid those kind of games at all cost.

One good example of this "pay-to-win" scenario game is RuneScape 3 (RS3), which is a massively multiplayer online roleplaying game, or MMORPG. In RS3 it is possible to buy keys, for real life money or in-game currency, for in-game minigame that awards players with experience to skills, bonus experience which doubles the experience gained from in-game actions, outfits that boost the experience gained and provide extra effects. Most of the RS3 playerbase hate this side of the game, because it is forced too much, and it takes too much resources from the game developers that they don't have time to develop anything "good" that could actually help the game grow and make it better. Since the release of RuneScape's 2007 version, Old School RuneScape (OSRS), the number of players had been declining on RS3's side. OSRS doesn't have these microtransactions, their developers have more time to focus on improving the game and adding more content, which made OSRS more popular of the two. And of course, OSRS has the nostalgia advantage, because a huge part of the community started playing RuneScape between 2004 and 2007.

4 FUTURE DISTRIBUTION OF GAMES

For ages there has been a heated discussion about where video game industry is heading. Many choose to remain optimistic, while an equal proportion expresses concern. The gaming audience is split. On one side there are older generations who experienced how retailers deliver games for decades and on the other side there's the younger generation who only know an industry embroiled in the power of the internet and what it can offer. (Banks 2018, cited 19.3.2019.)

The current distribution state has been in the making since the seventh generation of consoles, which includes Xbox 360 and PlayStation 3, became fully compatible with the internet. Before the seventh generation consoles, online distribution platforms, like Steam and GOG, meant the sudden death of PC titles finding their way to stores. When seventh gen consoles arrived, they introduced the idea of downloadable content, as an answer to Steam, but they still provided incentives for you to buy physical copies, such as pre-order bonuses. (Banks 2018, cited 19.3.2019.)

In under a decade, shipping a game in parts, after taking a full payment, has shaped how developers make game titles. This strategy has affected everything, from game design principles to consumer expectations. In this case also there are the two sides. The older of which laments the idea of not having a complete package after initial purchase. While the younger, having known no other form of distribution, will get disappointed to buy a game and notice the lack of content in the years after the release. (Banks 2018, cited 19.3.2019.)

Because of these changes set forth by the internet, AAA game publishers are leaning towards multiplayer formats. With multiplayer format, companies like Electronic Arts, Activision, Ubisoft and Rockstar Games can focus on long-term profits per title, by adding content in the future and implementing microtransactions. (Banks 2018, cited 19.3.2019.)

4.1 Optimistic future

Consoles are lacking on the logistics of how to distribute games. Online distribution platforms like Steam and GOG seem ahead of the curve when it comes to more of an “instant gratification” kind of purchase. It’s that same consumer satisfaction that has led to the success of microtransactions, regardless of how many of us may lament their existence. (Banks 2018, cited 19.3.2019.)

When breaking down the buying process of video games, digital marketplaces have many advantages, not just to the consumer but also to the developer and publisher. It can save serious money. On average, 27% of the game purchase goes to the retailer, then a portion of the revenue pays for boxes, the artwork upon them and the creation of the disc itself. (Banks 2018, cited 19.3.2019.)

According to a “rough guide” made by Eurogamer, only roughly 30% of a game’s retail price goes to the publisher, and of that publisher’s revenue, 25%, after deductibles, goes to the developer if a third-party is behind the game (Yin-Poole 2011, cited 19.3.2019.) As much as we may like it or hate the idea, the death of physical stores would be a plus for the people who create and deliver games to us (Banks 2018).

Having a contract with a publisher has both advantages and disadvantages. One of the advantages is that publishers provide more money to the developers which allows them to hire more people to work on the project if needed, use more expensive technology for their game and publishers provide help with marketing. Disadvantages are however a lot heavier. Publishers may want to take the game to a different direction than the developers, and most of the time developers have to follow that road the publishers set for them.

On the other hand, not having a contract with a publisher gives the developers full control of their own project, they are free to do what they want with. When developers are left to their own devices, they are capable of great and original things (Banks 2018). Publishers’ lessened presence might likely see the microtransactions and DLC bubble burst after so long. Games will once again have to be sold on the developers merit alone and profits will grow as a result of sheer undeniable originality and the word of mouth that brings. (Banks 2018, cited 8.4.2019.) Being a self-publishing developer is a lot easier now than it was 10 or 15 years ago. Developers don’t have to rely on publishers anymore. Internet marketing is cheap and easy, and it brings the most visibility to a

game. Game engines like Unity are free to use with nearly all the features unlocked. Unity, however, requires royalties if a game using their game engine is published and it generates money to the developer.

4.2 Pessimistic future

While there is the chance that a fully digital marketplace could poke and prod publishers out the door, there is one big problem that still needs attention on a global scale. It is part of a wider issue about the internet itself, which will be the foundation pillar to prop up our digital gaming mecca. (Banks 2018, cited 8.4.2019.)

This problem is lawlessness. Laws exist to prevent us from descending into a Mad Max world, that in itself is testament to how important regulations are, whether we agree with them or not. There are attempts at enforcement of something that only exists in the online space. Known as House bill 2686 and Senate bill 3024 would restrict retailers from selling games featuring purchases of “a randomized reward” to anyone under the age of 21 in the state of Hawaii. (Banks 2018, cited 8.4.2019.)

Another potential problem that sits threateningly closer in our gaming timeline is the survivability of singleplayer titles. 2017 was the year of lootbox controversies, but that eventually made us pay attention to the waning profits of narrative driven experiences. (Banks 2018, cited 8.4.2019.)

Brick and mortar stores appear to be getting less relevant. Not only do they have the growing digital marketplace to contend with but also other retailers like Amazon. (Banks 2018, cited 8.4.2019.) If there will be a transition to a fully digital world of gaming, it would mean that brick and mortar game stores will become extinct.

5 FUTURE PLATFORMS

The types of games available vary, but they all share the most common element that the industry has managed to maintain since its inception – the way users interact with this medium. There is always a gamer and a device. Unfortunately, we haven't yet seen a system that reads the player's mind and does all the work reach a mass market. The keyword here is "yet." (Lozada 2018, cited 8.4.2019.)

It is impossible to predict how people will be playing 5 years from now, seeing how the industry changes by the day. For example, something may come that threatens the existence of PCs. Just that there is no way of knowing how.

5.1 Optimistic future

For PC gamers, the issue of keeping up-to-date with hardware hasn't been as great as having to invest in a new home device every couple of years. Users simply need to swap out their graphics cards, processors, or other components to have their machine suited for current generation standards. Consoles have never had such modular functionality. To keep consoles up-to-date with modern gaming, players need to buy a new unit entirely, even if their old one has parts that are similar to those found in the upgrade. (Lozada 2018, cited 8.4.2019.)

PC gaming has been around for a long time already and its basic idea stays the same, players will still have to upgrade components from time to time, only thing that might change is the size of the components. Processors are already very small and pack a lot of power, graphics cards are one of the largest components a PC build has so there is a possibility that one day the cards will have reduced size that doesn't affect the performance. One of the biggest problems with graphic cards' size is cooling. Bigger size enables better cooling while smaller size would need a new way to cool down the cards. It is already possible to utilize water-cooling to graphics cards however it might not be enough if a powerful card were to get reduced size.

In an optimistic future for gaming platforms, the landscape will be diversified enough to create more competition in the hardware space. Aside from consoles, PC games, and the mobile front, a new

way to play may arise in the coming years significant enough to capture a wide audience of people. (Lozada 2018, cited 8.4.2019.) Whatever it may be, the new way of gaming has to be accessible to “regular” consumers when it comes to pricing.

5.2 Pessimistic future

There are 3 major consoles on the market: Nintendo Switch, Xbox One family of devices and PlayStation 4 brand. Each platform has a mid-generational upgrade, except for Switch, that offers greater graphical fidelity and better overall performance in the Xbox One X and PlayStation 4 Pro, even though the performance PS4 Pro and Xbox One X offer is no match for a PC in performance. There are also slimmer models of each machine, except for Switch. (Lozada 2018, cited 8.4.2019.) Mobile gaming has also lifted its head from slumber and it has become immensely popular in the last 5 years, as global revenue has been increasing by the billions every year (in 2018 its worth was 47.4 billion USD, in 2015 it was 30.4 billion USD). It helps that users can effortlessly download titles from Apple’s App store or Google’s Play store. The mobile market has become quite impossible to ignore as Microsoft, Sony and even Nintendo have produced dedicated smartphone titles. (Lozada 2018, cited 8.4.2019.)

On top of it all there is the PC gaming market that only seems to grow every year. With users able to use console controllers for their computer gaming and the popularity of mods increasing, not to mention a renewed support from third-party publishers responsible for hit franchises like Final Fantasy and Destiny, it appears PC gaming is what console manufacturers are looking at to get an idea on how to survive on modernity. (Lozada 2018, cited 8.4.2019.)

Considering how upgrading a machine is becoming increasingly more intuitive and that today’s youth is well-versed with technology, the biggest advantage of consoles, not needing to learn how to upgrade one’s PC, may fade away in the future. This would decrease the incentive to buy a console, thus threatening its market to go away. (Lozada 2018, cited 8.4.2019.)

6 CLOUD GAMING

There is a new way to play games in development. It could be called cloud gaming, since it allows the player to enjoy the game completely on cloud, thus not requiring the player to download the game on their system. One of these ways is already functioning PlayStation Now. Google also has its own game streaming service in development and it is said to be released by the end of 2019. And, of course, there are reports of Amazon working on its own video game streaming tech (Serrels 2019).

PlayStation Now offers a large library of games for a monthly fee of 14,95 euros. The service is available on PlayStation 4 systems and the library currently holds over 600 game titles, also including PlayStation 2 and PlayStation 3 titles. And more games are added to the library every month. This service also allows the player to optionally download the preferred games into the system for offline playing. There is one downside to this kind of cloud gaming and that is internet connection. The connection has to be fast enough and stable for this service to properly stream the games to one's system and that kind of connection is not quite yet accessible to everyone. The games, however, act like any other game, digital or physical, with the possibility to play multiplayer games. (PlayStation 2019, cited 21.4.2019.)

7 ESPORTS EFFECT

There is no mistaking that esports has taken this world like a storm. It's an opportunity, career, entertainment. It's a fact that esports has also had an effect on how video games are developed. Esports has increased focus on competitive, yet collaborative gameplay and that's why most of the multiplayer aspects in a video game involve a team working together to secure an objective, for example. The game developers direct their games this aspect in mind. If the game becomes popular enough, they'll probably organize an event, online or offline, that lets people compete against each other for more than in-game fame, usually prize money. It's common that these events take place during different conventions like Gamescom or Dreamhack.

Game developers also develop their games in a way that it will be easy to implement as an esport. The current e-sports games get more frequent updates to keep new content coming and tweaking older content for it to stay relevant.

The gaming industry has reached a level of legitimacy in the arena of public opinion that it never had before, and this is partially due to the phenomena of esports. The idea that video games are merely tools of laziness and evil has been turned on its head. (Wallace 2018, cited 11.4.2019).

8 HARDWARE DEVELOPMENT

In the past few years, video games have started to affect IT development in a way of optimisation. Manufacturers like ASUS and Nvidia have started to make components optimised for gaming. ASUS has Republic of Gamers as an indication that the particular component or pre-built PC is made more with gaming in mind. Nvidia's GeForce brand is also primarily meant for gaming.

Central Processing Unit, or CPU, plays a big part how a computer works, especially in gaming. If the CPU isn't fast enough, it will cause trouble for other components like the graphics card which won't be able to perform to its full potential. This phenomenon is called bottle-necking and it usually happens between the graphics card and CPU, where one restricts the performance of the other. It can happen both ways. It is very important to pick components that are compatible with each other when building a PC.

The amount of VRAM (video RAM) used in gaming graphics cards currently goes as high as 12GB, however there are graphics cards with 32GB of VRAM, but they are rarely used by consumers due to their incredibly high price tag and are mostly targeted for professional use.

Gaming mice and keyboards are becoming more and more common. Gaming keyboards tend to be mechanical and there is a wide variation of different key switches, Cherry MX switches being the most commonly used. Some manufacturers have their own switch designs like Razer has green, orange and yellow switches, even though those have a lot in common with Cherry MX switches. Razer has also come up with a new key switch, which is called Razer Opto-mechanical switch. It utilizes receivers and light signals which allows the command to be instant.

9 CONCLUSION

The purpose of the thesis was to go through a little bit of gaming industry's history, take a look at how the industry is doing today and how it might be in the future while also looking a bit into how esports has affected the industry and how game industry has affected IT development.

Game industry has come a long way to where it is today, and it keeps evolving. We learned that along the way to success, game developers are sometimes forced to make decisions that don't necessarily reflect their original intentions with the game, regarding microtransactions, due to the pressure received from publishers or investors. We also learned that staying away from publishers is good for the health of the game, the developers get to do what they want and how they want to do it.

About the future it was kind of obvious that there are two or three possibilities how things will turn out. There is the optimistic future and pessimistic future, and then there is a chance that things will stay on the same route they are on currently. Personally, I think there will be some new interactive way of gaming, an improved version of Virtual Reality gaming so to say, where the player has more control over the game character's movement. Maybe an interactive virtual game room could be happening in the near future if it already hasn't, since interactive art showcases in closed areas are already a thing.

Overall the thesis was successful, but there's always room to improve in everything. Time could've been used better and the work could've been done faster. This thesis is useful for someone who wants a brief overview of game industry's history and would like to see some thoughts about the future.

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