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**FACULTY OF BUSINESS MANAGEMENT**

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# GLOBAL VIDEO-GAMES INDUSTRY, ITS INFLUENCE ON WORLD ECONOMY AND ITS POSSIBLE FUTURE DEVELOPMENT

**Diploma Thesis**

**2016** **Polák**

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**Diploma Thesis**

**Study Program:** General Management

**Study Branch:** Economics and Business Management

**Department:** Department of Information Management

**Tutor:** Ing. Mgr. Róbert Hanák PhD.

**Bratislava 2016** **Bc. Peter Polák**

## DECLARATION

I hereby declare that this diploma thesis was composed by me and I listed all used sources of references.

Date: .....

(Student signature)

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**Bratislava 2016**

# ABSTRACT

POLÁK, Peter: *Global Video-games Industry, Its Influence on World Economy and Its Possible Future Development.* University of Economics in Bratislava. Faculty of Business Management; Supervisor: Hanák Róbert, Ing., Mgr., PhD. – Bratislava: EU, 2016, 97 pag.

The topic of the diploma thesis is the analysis and evaluation of video-game industry and comparison of the data gathered from video-game company and survey with worldwide data. The main goal was to analyze players of video games, how much time they are spending on video-games and how much money they spend. The diploma thesis is divided into five chapters. These include: 5 Tables, 20 Graphs and 22 Figures.
The results of the data analysis from survey, *TrainStation* game and comparison with U.S. ESA showed that many people play video-games on daily basis and are willing to pay for games. Most people that play are young people from 21 to 30 years; however, degree and gender do not seem to have an impact on who is playing games. Interesting is that even the most casual gamers play at least an hour a day. 42 percent of gamers are not spending money on video-games monthly. Computer was the sole winner of most used device for playing and the main reason why people spend time and money on video-games and why they play was ‘to have fun’. Based on my results I was able to disprove several general presumptions about distribution of players.

## Key words:

Video-games, video-game industry, video-game survey.

# ABSTRAKT

POLÁK, Peter: *Svetový Video herný Priemysel, jeho Vplyv na Svetovú Ekonomiku a jeho Pravdepodobný Budúci Vývoj.* Ekonomická Univerzita v Bratislave. Fakulta Podnikového Manažmentu; Školiteľ: Hanák Róbert, Ing., Mgr., PhD. – Bratislava: EU, 2016, 97 str.

Témou diplomovej práce je analyzovať a vyhodnotiť video herný priemysel a porovnať dáta poskytnuté video hernou spoločnosťou a zozbierané v dotazníku so svetovými dátami. Hlavným cieľom je analýza hráčov videohier, koľko času trávia videohrami a koľko peňazí na ne míňajú. Diplomová práca je rozdelená na päť kapitol. Tie zahŕňajú: 5 tabuliek, 20 grafov a 22 príloh.

Výsledky analýzy dát z dotazníka, hry *TrainStation* a porovnania s americkou ESA ukázali, že veľa ľudí sa hrá videohry každý deň a sú ochotní za ne platiť. Väčšina hráčov je vo veku od 21 do 30 rokov, avšak vzdelanie a pohlavie nemajú dopad na to, kto sa hrá hry. Zaujímavé je, že aj tí najviac príležitostní hráči sa hrajú aspoň hodinu denne. 42 percent hráčov nemíňa peniaze na videohry mesačne. Počítač bol jednoznačný výherca ako najviac používané zariadenie na hranie hier a hlavný dôvod, prečo ľudia trávia čas a míňajú peniaze na videohry a prečo sa hrajú je ‘aby sa zabavili’. Na základe mojich výsledkov som mohol vyvrátiť niekoľko všeobecných domnienok o rozdelení hráčov.

## Kľúčové slová:

Videohry, video herný priemysel, video herný dotazník.

# CONTENTS

# INTRODUCTION

As topic of my diploma thesis, I have chosen global video-games industry, its influence on world economy and its possible future development. In today's age of globalization and world connected by internet, video-games are one of the well-known forms of entertainment. The term of video-game is connected with playing games on computers, consoles, mobile phones and also on tablets.

In my thesis, I would like to provide an extensive view on global video-game industry, its history, how it developed and expanded since its beginning, today, and in the future. I will look closely on computer games, mobile and tablet games and console games. Also I will state some hypothesis and conclusions.

The theoretical part will contain how complex the video-game industry really is, comparison of biggest video-game companies, list of the most selling games and how much those games earned. There will be a business model of video-game industry and how this model changed in recent years. In the end of theoretical part, I will summarize the whole market and write about possible future development of video-game industry.

In practical part, my goal is to gather real life data from a video-game company and to create a survey about video-games and video-gaming habits people have. I will analyze the gathered data from the company and the survey compare them together and with survey about video-games and gaming habits in United States conducted by an U.S. Entertainment Software Association.

The results of the data analysis from survey and *TrainStation* game showed, that many young people play video-games on daily basis and are willing to pay for games. School degree, gender and salaries do not have an impact on the fact that people play video games or how much they play.

Lot of gamers spends multiple hours each day to play their favorite video games and some play more than 4 hours each day. Still, people do not like to spend money monthly, they rather download a game or play free-to-play games, but if some interesting title or game arises, they are willing to spend tens of Euros to have the game first and play it.

Even with the rise of smartphones and tablets, computers still remain the best choice and were most selected for playing video-games. With their hardware options available, they are better than any other device capable to run video-games and also there are dozens

of different software which allow running any game, even the old ones which were only available on consoles.

People like to play casual and social games, but most gamers prefer Role-Playing games and Strategy games. That comes hand to hand with the reasons why they play video games, as most gamers play it because “it is fun” and also “because of the story” of the games. Role-Playing Games always have some kind of interesting story to solve.

Video games are entering households and are becoming something that most people do daily to pass time or to relax after difficult day in work. People are slowly starting to prefer video-games over television, books or other kinds of activities they could do in their free time. This is beneficial for the video-gaming industry, as new technologies as virtual reality are coming and people are adopting video-games more than before.

# 1. THEORETICAL BASELINE

## 1.1. History of video-game industry

To understand the operations and development within the video-game industry, knowing its history is essential. How the whole industry begins, which people made the significant impacts that shaped the industry, which games pushed the industry into revolution and what were the reasons to its global expansion are all topics that will be covered in theoretical baseline of diploma thesis.

Video-game industry is not very old industry, as first game is dated in 1958 and then started to become more popular over years. The big increase in availability and popularity came with first computers and consoles in 1970s and 1980s, but the real boom came with the globalization and internet in 1990s. It can be said that video-game industry is not more than 40 years old. It is still shaping, growing and entering the daily lives of people.

Next chapters start with first video-games made, the early years of video-game industry and most influential persons who shaped the industry. Following chapters have timeline approach and talk about specific studios, games and people, which made the biggest impact on this industry, ending in the present.

## 1.2. The Early Years (1952 – 1970)

### *1.2.1. William Higinbotham and Tennis for Two*

William Higinbotham, who was the head of Brookhaven National Laboratory, was the first person who invented a computer game. National Laboratory was making yearly exhibits, and in 1958, he realized that people are not interested in static exhibits and they want something interactive. So William came up with the idea of interactive display, which would be a video tennis game.[1]

He teamed up with technical specialist, Robert V. Dvorak, who wired up the patch-board, which William designed. First, it took them more than 3 weeks to assemble everything, and then they spend another two days with making the game functional and finished it just before first tour started. The game, called *The Tennis for Two* (Appendix 1, Figure 1), was a big success. It was running on analog computer and was connected to an

[1] Kristen J, Nyitray. 2011. *Biographical Sketch: William (Willy) A. Higinbotham.* Retrieved on November 2015 from http://www.stonybrook.edu/commcms/libspecial/videogames/whbio.html

oscilloscope. The game was side view of a tennis court and allowed two players to smash the ball forth and back and the ball behaved realistically with bouncing off the ground and net, apparently because of gravity.[2]

The game was quite impressive, but William did not realize he created something unique, because the analog computer he used had already manual how to simulate things on oscilloscope. Even though he allowed two people to play, he did not think it is a major breakthrough. Hundreds of people saw the exhibit, but the game did not reach the right people and nobody recognized the significance this game had. So in 1959, *The Tennis for Two* was dismantled and replaced.[3]

### *1.2.2. Steve Russell and Spacewar*

The computers were quite rare in 1961, but they could be found in prestige schools. Steve Russell was a student on MIT (Massachusetts Institute of Technology) and in half a year and more than 200 hours, he created video-game for two players. The goal of the game was to maneuver with a spaceship while trying to shoot other player's spaceship with torpedoes. There were four buttons, so each player could thrust forward, rotate clockwise or counterclockwise and shoot torpedoes.[4]

Even though the game itself was created in 1961, it has been expanded in 1962. Many people helped to improve the game. Pete Sampson added accurate star-field background, and then Dan Edwards improved the game by allowing gravitational computations to be made. Sun was added in middle of the map and players could sling-shot themselves around the sun by using the gravity to accelerate. Last thing added was the concept of hyperspace. Player could jump to any random generated area on the map (Appendix 1, Figure 2).[5]

The game itself was running on PDP-1 computer and was big success and sensation within MIT. Problem was, that cost of PDP-1 computer in 1960's was more than $120 000 and people could not afford it. That is the reason, why Russell did not profit for inventing

[2] Rabin S. 2010. *Introduction to Game Development.* Course Technology, a part of Cengage Learning, Boston, USA. ISBN-13: 978-1-58450-679-9, p. 4

[3] Rabin S. 2010. *Introduction to Game Development.* Course Technology, a part of Cengage Learning, Boston, USA. ISBN-13: 978-1-58450-679-9, p. 5

[4] Lowood H. 2009. *Videogames in Computer Space: The Complex History of Pong.* IEEE Computer Society, Washington DC, USA. 1058-6180/09/, p. 7

[5] Lasar M. 2011. *Spacewar!, the first 2D top-down shooter, turns 50.* Retrieved on November 2015 from http://arstechnica.com/gaming/2011/10/spacewar-the-first-2d-top-down-shooter-turns-50/

this game. Later on, the game ended as a diagnostic program that was shipped with new PDP computers, so the game was distributed to customers for free.[6]

### *1.2.3. Ralph Baer and the Magnavox Odyssey*

Ralph Baer was a division manager at Sanders Associates, which was a military defense contractor. In middle of 1966, he had an idea of making games for home televisions. After the game was finished and he presented it to the executive board, they wanted to discard the project because they thought he was just wasting money. On the other hand, his boss was impressed and so the project remained alive. During 1967 and 1968, with help of Bill Rusch, the games were improved and they created a hockey game.[7]

He was not in the television business and he wanted to sell the home video-game system, which was actually the first console made, to a large manufacturer. Several companies rejected him, but company Magnavox signed contract with him in 1971. In 1972, Magnavox showed the new device (Appendix 1, Figure 3), but as the console was overpriced and had limited marketing, it was unnoticed by the public and never reached popularity.[8]

## 1.3.The Golden Age (1971 – 1983)

### *1.3.1. Nolan Bushnell and Computer Space*

Nolan Bushnell graduated at University of Utah in 1968 and was experimenting with computer graphics. He became a fan of Steve Russell's Spacewar and convinced several students to help him create video-games. As a fan of *Spacewar*, he wanted to re-create it. Computers with enough computational power were too expensive and regular ones were too weak to run the game. So he came up with an idea of coin-operated device that would play just his one game, named *Computer Space*.[9]

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[6] Rabin S. 2010. *Introduction to Game Development.* Course Technology, a part of Cengage Learning, Boston, USA. ISBN-13: 978-1-58450-679-9, p. 5

[7] Baer, R. 2014. *Genesis: How the Home Video Games Industry Began*. Retrieved on November 2015 from http://www.ralphbaer.com/how_video_games.htm

[8] Baer, R. 2014. *Genesis: How the Home Video Games Industry Began*. Retrieved on November 2015 from http://www.ralphbaer.com/how_video_games.htm

[9] Lowood H. 2009. *Videogames in Computer Space: The Complex History of Pong.* IEEE Computer Society, Washington DC, USA. 1058-6180/09/, p. 9

After completing the prototype, he was able to find a manufacturer, which agreed to produce his machine. It was Nutting Associates, which already operated in amusement business and had a game called Computer Quiz. They hired Bushnell as chief engineer and created first 1500 *Computer Space* machines (Appendix 1, Figure 4).

People did not welcome such a arcade with open hands. Even though Bushnell demonstrated the game in 1971 at Music Operators Association show, only few arcade owners bought the machine. Audience saw the game too hard and complex. This was a blow to Nolan, but his spirit of entrepreneur told him to continue. So, he started a new company, which would produce arcade games. And that company would become Atari.[10]

### *1.3.2. Atari, Pong and the 2600*

In world of computer games, Atari is well-known. Back in 1972, it was just a small startup, which Bushnell created. After starting his company, he hired Al Alcorn, to create a Ping-Pong based game. It took three months to create the prototype, the *Pong* game. To be sure it will be desired, not like *Computer Space* which failed, they tested it two weeks in local bar. When they realized that people love the game and it is a hit, they started to market it. Then, Magnavox Company took Atari to court.[11]

As was revealed on court, Ralph Baer had records of his invention processes and also created many patents in 1960's. As Magnavox stated, Atari has stole his ideas by copying his patents and also copied his Ping-Pong concept of game. There were witnesses that Bushnell was at one demonstration of Magnavox Odyssey game, which was very similar to *Pong* (Appendix 1, Figure 5), in 1792. The court took years and in 1976, Atari made a deal and one-time license payment of $700 000 to Magnavox.[12]

*Pong* reached success and became first well-known game and is viewed as game that started the video-game industry revolution. Atari had big success, but had to deal with competitors, who copied *Pong* and were taking Atari's success as own. To keep them at

[10] Rabin S. 2010. *Introduction to Game Development.* Course Technology, a part of Cengage Learning, Boston, USA. ISBN-13: 978-1-58450-679-9, p. 7

[11] Baer, R. 2014. *Genesis: How the Home Video Games Industry Began*. Retrieved on November 2015 from http://www.ralphbaer.com/how_video_games.htm

[12] Chantal, S. 2015. *Welcome to the real "PONG" F.A.Q*. Retrieved on November 2015 from http://pongmuseum.com/faq

bay, during 1970's, Atari created first racing game ever, *Gran Trak 10* and also the first chase game, *Gotcha*. [13]

*Pong* was a big success, but it was also too large to fit into regular households. The video-game industry started to evolve and the next step from big arcades in bars were cartridge-based consoles. To not fall behind competition, Atari produced its first cartridge console named Atari Video Computer System, also called Atari 2600 (Appendix 1, Figure 6), in 1977. They were not the first company to enter console market but they had big success. At the start, the console had only nine games, but it made shift from hardware to software by adding colored graphics, selecting between difficulty settings and also the first joystick for households.

What Atari did not foresee, was that third-party companies started to produce games for the console without agreement with Atari. Most famous of these third-party companies was Activision, which was created by former employees of Atari. Atari tried to stop the companies from creating games for the console, but as it was not effective, it started to charge royalties on the produced games. This practice and way of business was so successful, that it is done even today between console manufacturers and game producing companies.[14]

### *1.3.3. The Video-game collapse in 1983*

The video-game industry was expanding and doing well until it crashed in 1983. The reason for the collapse was the recession in economy, natural market cycles and people, who viewed video-games as crazy idea. Part of the blame also took Atari with its 2600 console. Atari, which had no impact on the third-party made games, could not do anything about the overflowing market of these poor designed games. If it was not enough, Atari produced home console version of Pac-Man which had bad graphics and was a disappointment. Also, they created E.T. game, which should be released in the same time as the Spielberg's movie. The game was put together in five weeks and the game rights were purchased for $20 million. Gameplay was bad, buggy and people did not want to buy them. Atari thought people would buy these games in masses, and they ended up

[13] Rabin S. 2010. *Introduction to Game Development.* Course Technology, a part of Cengage Learning, Boston, USA. ISBN-13: 978-1-58450-679-9, p. 7

[14] Rabin S. 2010. *Introduction to Game Development.* Course Technology, a part of Cengage Learning, Boston, USA. ISBN-13: 978-1-58450-679-9, p. 8

producing more cartridges, than were the Atari 2600 consoles in households. These fails piled up also with the third-party game creating companies and hit Atari so hard, that they never regenerated from the damaged reputation and loss of money.

Computers became cheap, so regular households could afford them and with affordable computers on the market, people started to buy them and not consoles. The computers were sold at the same stores, where consoles and offered things which consoles did not. They were able to duplicate any game which was playable on console and also offered software for accounting, writing and similar programs, resulting in increasing popularity among people. Some computer companies offered deals for people, that they can trade-in their used consoles and get some discount on computer.[15,16]

Third-party games, failed games, cheap computers and bad economy made the video-game market fall. The third-party game producers had to close their businesses because they were unable to sell games. Atari tried to save itself by selling products very cheap, but that strategy was not effective and they also collapsed. Big companies, such as Magnavox, changed their business. This recession took years to change and it changed by enter of Japanese company Nintendo and its NES console.

## 1.4.The Modern Age (1984 – 1994)

### *1.4.1. Shigeru Miyamoto and Nintendo*

Nintendo is a Japanese video-game producer. It was founded in 1889 and it produced Japanese playing cards. As the times changed, Nintendo saw big market place in video-game industry. It was Nintendo who resurrected video-game industry from the 1983 crisis, to later become the video-game leader.

Nintendo joined the mainstream with its *Game and Watch* series in 1980. It was created by Gunpei Yokoi and it was a part of more than fifty handheld games that had one or two LCD screens. Each handheld game had one simple game in it and also could serve as digital watch, hence the name of the series. He was the man who invented Game-boy

[15] Oxford, N. 2011. *Ten Facts About The Great Video Game Crash Of '83*. Retrieved on November 2015 from http://www.ign.com/articles/2011/09/21/ten-facts-about-the-great-video-game-crash-of-83

[16] Rabin S. 2010. *Introduction to Game Development.* Course Technology, a part of Cengage Learning, Boston, USA. ISBN-13: 978-1-58450-679-9, p. 9

handheld device. Later on, he created the very famous *Metroid* game for the NES console.[17]

Even though the *Game and Watch* series were successful, not everything was going well for Nintendo. They created and shipped 3000 Radarscope arcade devices with installed games to United States, but they were selling very badly and just around 33 percent of the arcades were sold. To solve this desperate situation, they gave an order to Miamoto Shigeru to design a new game, which could be installed to the arcades. The story was easy and straightforward. It was about a gorilla who stole carpenter's girlfriend. First, the carpenter's name was Jumpman, because he had to jump around the field, to reach his girlfriend. Later, he was renamed to Mario and the game came out as Donkey Kong.[18]

The game was such a big success, that all the remaining Radarscope arcades with *Donkey Kong* (Appendix 1, Figure 7) were sold in 1981 and the orders were increasing rapidly. It is believed, that this game is the most influential arcade game ever created and more than 65 000 arcades were sold just in the United States. The total combined games sold with Mario as character, who also became Nintendo's mascot, is more than 200 million games.[19]

Next move was to create their own console. The NES console came with a gun and a robot called ROB (Robotic Operating Buddy) and wasn't called video-game system, but entertainment system. Nintendo had a policy, that they would buy any unsold console back. This made the sellers and retail stores more secure. In the late 1980's, Nintendo was so successful with its games and NES consoles, that they completely dominated the market with more than 90 percent of video-game market share. They were also afraid that the trademark "Nintendo" would be lost, because it was used as synonym for "video-games" or "video-game machines". The fear would diminish later when term "PlayStation" started to be used as a word used for video gaming consoles.[20]

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[17] Nintendo. 2015. *Nintendo History*. Retrieved on November 2015 from http://www.nintendo.co.uk/Corporate/Nintendo-History/Nintendo-History-625945.html

[18] Rabin S. 2010. *Introduction to Game Development.* Course Technology, a part of Cengage Learning, Boston, USA. ISBN-13: 978-1-58450-679-9, p. 10

[19] Rabin S. 2010. *Introduction to Game Development.* Course Technology, a part of Cengage Learning, Boston, USA. ISBN-13: 978-1-58450-679-9, p. 10

[20] Rabin S. 2010. *Introduction to Game Development.* Course Technology, a part of Cengage Learning, Boston, USA. ISBN-13: 978-1-58450-679-9, p. 10

Today, Nintendo is considered one of the biggest players in video-game industry. It is dominating the hand-held market with its Game Boys, Nintendo DS and also latest Nintendo 3DS, which has 3D graphics. The released consoles were as successful as they were expected to be, but the competition was strong and sales numbers weren't that great. This changed with release of popular Wii in November 2006.[21]

Nintendo Wii (Appendix 1, Figure 8) console came up with completely new controller, but its hardware was not that good. That was done to lower the cost as possible, so the introduction cost was only $250. Nintendo released innovative and popular games to outweigh the low graphics and slow hardware. It was quite a risky move, but in December 2008, just two years after release, they sold more than 45 million units worldwide. This is almost 50 percent of current-generation console sales. Wii was also bundled with one game, Wii Sports, which used the controller to play games such as tennis, golf, etc. To date, the world's top bestsellers in video-games were all made by Nintendo. Also, from the top 20, just four games were not made by Nintendo. Nintendo still owns the biggest part in video-game industry, even today.[22,23]

### *1.4.2. Sega Enterprises Ltd.*

Sega is a Japanese company, which was grounded by American Dick Stewart and Ray Lemaire in 1952 as Service Games. These two people saw big market in U.S. military bases, where they were selling jukeboxes and other amusement machines for soldiers. The company rose and the name was changed to Sega, which is actually shortcut of the original company name (SErvice GAmes). [24]

After the Second World War, the Japanese economy was recovering and Sega saw big market. In 1965, Sega merged with Rosen Enterprises. Rosen Enterprises was a company made by Dave Rosen in 1953. The whole goal of the company was to import arcades from

[21] Nintendo. 2015. *Nintendo History*. Retrieved on November 2015 from http://www.nintendo.co.uk/Corporate/Nintendo-History/Nintendo-History-625945.html

[22] Rabin S. 2010. *Introduction to Game Development.* Course Technology, a part of Cengage Learning, Boston, USA. ISBN-13: 978-1-58450-679-9, p. 10

[23] Nintendo. 2015. *Nintendo History*. Retrieved on November 2015 from http://www.nintendo.co.uk/Corporate/Nintendo-History/Nintendo-History-625945.html

[24] Rabin S. 2010. *Introduction to Game Development.* Course Technology, a part of Cengage Learning, Boston, USA. ISBN-13: 978-1-58450-679-9, p. 11

United States and sell them to Japan. After the merge, the new company was named Sega Enterprises Ltd, which is famous for creating one of the best arcades ever made.[25]

As they started to produce arcade video-games in 1970, they acquired company named Gremlin and so, the expansion into games for consoles started. In start of 1980's, Sega Enterprises Ltd became a part of Paramount company, which was making movies. Then the crash in 1983 came. Rosen, Nakayama, who was director in Japan and Ohkawa, who was an investor from Japan bought the company back. Nakayama was designed as the president of the company, while Rosen was responsible for U.S. and Ohkawa for Japan.[26]

Even through the acquisitions, time under Paramount, buyback and so on, the company was still working on its own console for households, called the Sega Master System (Appendix 1, Figure 9). As they saw Nintendo's console NES, which revived the video-game market, they released their own console a year after Nintendo released NES.[27]

The console wasn't a big success, but in mean time, Sega started to work on new console, the 16-bit for next generation. The new console was called Genesis (Appendix 1, Figure 10) and it was released before Christmas in 1990. The main competitors for the console were already seven year old NES console from Nintendo and new Nippon Electric Company's ("NEC") PC Engine. Sega won the battle, because NES console was too old to compete with Genesis and NEC did not have well-known games. Electronic Arts made a deal with Sega, so Sega got even more support. This 16-bit console battle continued and Sega, Nintendo and NEC were the biggest players and competitors in this war.[28]

Sega continued to improve and develop consoles and in 1994 in Japan, and year later in United States, they introduced a new system, called Saturn. The system was $100 more expensive than PlayStation, it was rushed into stores so it had problems with the supply chain and if that was not enough, consumers were not happy with Sega, because it failed to

[25] SEGA. 2015. *Sega Group – Corporate History*. Retrieved on November 2015 from http://sega.co.jp/corporate/profile_history/

[26] Kidd, A. 2009. *Ign Presents The History Of Sega*. Retrieved on November 2015 from http://www.ign.com/articles/2009/04/21/ign-presents-the-history-of-sega

[27] Rabin S. 2010. *Introduction to Game Development.* Course Technology, a part of Cengage Learning, Boston, USA. ISBN-13: 978-1-58450-679-9, p. 12

[28] Kidd, A. 2009. *Ign Presents The History Of Sega*. Retrieved on November 2015 from http://www.ign.com/articles/2009/04/21/ign-presents-the-history-of-sega?page=4

release add-ons for Genesis system. The system wasn't very popular, even though it had add-ons, such as modem and that lead to its end by 1998.[29]

Sega tried to regain market share and improve its reputation and in 1999, they released their last console, named Sega Dreamcast (Appendix 1, Figure 11). The console was innovative in comparison to competition, because it had 128-bit graphics, built-in 56K modem or support for graphical memory cards.[30]

The console still did not have as much success as it was expected. The consoles which were on the market, Sony's PlayStation and Nintendo's N64 had great support and good bases in the market. On top of that, Sony announced PlayStation 2, which was next generation console and it had great graphic and hardware and Microsoft stated that it will enter the market with its own console. So, the Sega Dreamcast was slowly pushed aside and the console did not even reach the end of its lifecycle. Sega realized its loss and shifted business to production of high quality software for other consoles.[31]

## 1.5. The Next Generation (1995 – now)

### *1.5.1. Sony's PlayStation*

Until 1988, Nintendo held almost whole gaming market and Sega was waiting for its chance. Sony perceived the market as very interesting, but did not make any action. The right time came and Sony made a deal with Nintendo to develop a CD-ROM for new Nintendo console. Using the knowledge Sony gained, it started to develop its own console, named PlayStation. By that time, Sony was the "sole worldwide licenser" of CD-ROMs. Nintendo felt afraid and thus abandoned the contract with Sony.[32]

Sony continued to develop its console and in 1995, the PlayStation console, also called PS, (Appendix 1, Figure 12) was released in United States. The release was successful. Solely during the first weekend, Sony sold more than 100 000 PlayStation

[29] Rabin S. 2010. *Introduction to Game Development.* Course Technology, a part of Cengage Learning, Boston, USA. ISBN-13: 978-1-58450-679-9, p. 12

[30] Kidd, A. 2009. *Ign Presents The History Of Sega*. Retrieved on November 2015 from http://www.ign.com/articles/2009/04/21/ign-presents-the-history-of-sega?page=9

[31] Rabin S. 2010. *Introduction to Game Development.* Course Technology, a part of Cengage Learning, Boston, USA. ISBN-13: 978-1-58450-679-9, p. 12-13

[32] IGN. 1998. *History Of The Playstation*. Retrieved on November 2015 from http://www.ign.com/articles/1998/08/28/history-of-the-playstation

consoles in North America. After the half year, more than 1 000 000 units were sold and two years later, the number of sold PlayStations hit more than 4 000 000.[33]

Because Sony did not produce good games, it hoped that third-party companies will produce quality and interesting games. The companies did not fail, and series such as Final Fantasy were released. As the CDs and CD-ROMs became more cheap and available, more third-party companies and game producers joined and PlayStation became even more popular.[34]

The next step was preparation and development of next generation console, the PlayStation 2 (Appendix 1, Figure 13). The development took some years, and in 2000, the console was on the market. Good and strong hardware, new DVD-ROM, which was able to play DVD movies, CDs and also had backward compatibility with PlayStation, helped secure strong position on the video-game market and PlayStation 2 dominated. In next ten years, there were more than 50 million units sold just in North America.[35]

Sony entered the handheld market in 2005. Sony developed PlayStation Portable, also called PSP (Appendix 1, Figure 14). The device was small, but it was disc-based, had MP3 player, movie player, possibility to connect to internet and it was more powerful than Nintendo DS. Still the PSP sales were behind Nintendo DS and did not fulfill the Sony's expectations, even though more than 43 million PSPs have been sold worldwide.[36]

To hold pace with competition, Sony released PlayStation 3 in 2006. The PS3 had top performing processors, blue-ray player, installed hard disk drive and could be connected to almost any television. Problem with PS3 was that it was high priced and did not have any great games. Sony lost some exclusive games, such as Grand Theft Auto, which could be played on other consoles as well, and that's why the PS3 conquered just 21 percent of that console generation market. Sony realized its mistakes and upgrader further PS3s, so now

[33] Sony Computer Entertainment America LLC. 2015. *The Playstation Story*. Retrieved on November 2015 from https://www.playstation.com/en-us/corporate/about/theplaystationstory/

[34] Rabin S. 2010. *Introduction to Game Development.* Course Technology, a part of Cengage Learning, Boston, USA. ISBN-13: 978-1-58450-679-9, p. 13

[35] Sony Computer Entertainment America LLC. 2015. *The Playstation Story*. Retrieved on November 2015 from https://www.playstation.com/en-us/corporate/about/theplaystationstory/

[36] Rabin S. 2010. *Introduction to Game Development.* Course Technology, a part of Cengage Learning, Boston, USA. ISBN-13: 978-1-58450-679-9, p. 13

they contain Wi-Fi, Internet browser, huge storage (320 Gb) for photos, games, music and any future upgrades to software and games.[37,38]

### *1.5.2. Microsoft and the Xbox*

Microsoft is a worldwide well-known company founded in 1975 by Bill Gates and Paul Allen. Microsoft is most known for its operating system, Microsoft, which is dominating the market. Microsoft is not very known for games, even though it produced famous *Age of Empires* and *Microsoft Flight Simulator*.

First idea to enter the console market came in 1998. The first console team came up with idea of "DirectX Box". The idea was, to create a console, which would be more similar to computer, so it would be stronger and could win over current consoles which were produced by Sony and Nintendo. In just two years, in 2000, Microsoft announced the new console Xbox (Appendix 1, Figure 15). It had improved specifications, did allow online play, downloadable content and had big storage. People were watching Xbox, but many remained skeptical, because they saw just regular computer, which was made to look like a console. To catch more attention of potential customer, Microsoft came up with first person shooter game *Halo*, which was exclusive for Xbox. Microsoft wasn't sure if the system will sell good, because of people being skeptical and also the price, which was $300, but after 20 days, more than 1 million consoles were sold.[39]

Xbox became popular, because of good support, regular software updates, Halo 2 game and new feature, Xbox Live, which was subscription based service, through which people around the world could connect and play games together. In 2005, the number of sold Xbox consoles were 24 million and next generation of Xbox was released, the Xbox 360 (Appendix 1, Figure 16). It was released more than year before Sony released

[37] Sony Computer Entertainment America LLC. 2015. *The PlayStation Story*. Retrieved on November 2015 from https://www.playstation.com/en-us/corporate/about/theplaystationstory/

[38] Rabin S. 2010. *Introduction to Game Development.* Course Technology, a part of Cengage Learning, Boston, USA. ISBN-13: 978-1-58450-679-9, p. 13

[39] Marshall, R. 2013. *The History Of The Xbox*. Retrieved on November 2015 from http://www.digitaltrends.com/gaming/the-history-of-the-xbox/

PlayStation 3 and Nintendo released Wii console. People, not willing to wait, bought Xbox 360 and so Microsoft was outselling Sony.[40]

The Xbox 360 had a lot of software problems and errors, which caused console or game to crash and the starting button turned red. That's why, people started to call it "Red Ring of Death". Microsoft increased warranty and started to repair and replace countless number of consoles. Even under these circumstances, the console was selling well and in next five years, almost 40 million pieces were sold. In the end of year 2012, the number of sold consoles was close to 75 million pieces.[41]

[40] Rabin S. 2010. *Introduction to Game Development.* Course Technology, a part of Cengage Learning, Boston, USA. ISBN-13: 978-1-58450-679-9, p. 14

[41] Marshall, R. 2013. *The History Of The Xbox*. Retrieved on November 2015 from http://www.digitaltrends.com/gaming/the-history-of-the-xbox/

## 1.6. The Present

### *1.6.1. Global Structure of the Video-game Industry*

The video-game industry is a billion dollar industry. Today, many video titles have budgets, which can be compared to budgets used when shooting a movie. The structure of video-game industry is complicated and to completely understand it, this part will provide an overview of the video-game industry, current big players, publishers and also platforms.

Video-game industry can be divided into three main categories: computers, consoles and mobile category. In Table 1 below, the differences between these three segments of video-game industry are clearly presented. The computer games run on table computers or notebooks. The consoles are hardware, which can be connected to television or a monitor and also handheld games. The mobile category contains telephones and tablets. As for last few years, web-based social games or casual games emerged. They fall both into a PC or mobile category, but even though they can be run on computer web browsers, the design of the games and the target audience is more closely to mobile games, so in general they are taken as mobile games.[42]

Table 1: *Video-game categories*

| **Computer** | **Consoles** | **Mobile** |
|---|---|---|
| Runs on operating system | Runs on dedicated hardware | Runs on phones and tablets |
| Wide variety in genre and expense | Wide variety of genre | Lower variety of genre |
| No single gatekeeper for platform | System controlled by IP owners | Social and casual games |
| Majority of sales through digital | Box product and digital but dominated by box product sales | Largest number of potential players |
| Expensive to develop | Expensive to develop | Least expensive to develop |

*Source:* *Mastering The Game - Business and Legal Issues for Video-game Developers.*

[42] Greenspan, D. 2013. *Mastering The Game - Business and Legal Issues for Video Game Developers*. Geneva, Switzerland. ISBN 978-92-805-2475-8, p. 18

The types of genres for video-games are diverse. There are also differences in story, age, how the game is played, if you can play through internet, if you can play with friends and many others.

In 2013, the global video-game market reached $93 billion. It is quite an improvement, because in year 2012, the market reached only $79 billion. That is more than 18 percent year-over-year improvement. It is estimated, that the market will reach more than $111 billion in year 2015.[43]

In Table 2 below are segments of video-game industry market, their revenues worldwide for years 2012-2015 in millions of dollars. The year 2014 and 2015 are an estimate. Also, on the bottom the total numbers of all segments can be found.

Table 2: *Video-game Market Revenue, Worldwide, 2012-2015 (Millions of Dollars)*

| **Segment** | **2012** | **2013** | **2014** | **2015** |
|---|---|---|---|---|
| Video-game Console | 37.400 | 44.288 | 49.375 | 55.049 |
| Handheld Video-games | 17.756 | 18.064 | 15.079 | 12.399 |
| Mobile Games | 9.280 | 13.208 | 17.146 | 22.009 |
| PC Games | 14.437 | 17.722 | 20.015 | 21.601 |
| **Total Video-game Market** | **78.872** | **93.282** | **101.615** | **111.057** |

*Source: http://www.gartner.com/newsroom/id/2614915*

### *1.6.2. Digital Distributors*

Computer games were sold in stores for a long time. But in recent years, this trend is declining and starting to be old and non-profitable. Online revenues from selling games for computers, consoles, and mobile improved by 30 percent in 2012.

So far, the biggest computer digital distributor, and leader, is Valve's Steam. Steam is the world's largest digital games distributor. On 24th February 2015, Valve announced, that there are more than 125 million active users of Steam around the world. Active users are people, who are regularly online on the Steam software. Steam has more than 4500 games for sale and because users can generate content for games, there are more than 400 million

[43] Stamford, C. 2013. *Gartner Says Worldwide Video Game Market to Total $93 Billion in 2013*. Retrieved on December 2015 from http://www.gartner.com/newsroom/id/2614915

different types of user-generated content available. Also, steam is available on most used operating systems, namely Windows, Mac and Linux.[44]

As visible on the Figure 17 (Appendix 1), the number of concurrent users (number of people who are online on the same time) is fluctuating based on daily hours, but the number of players is increasing.

Next software after Steam is Origin. Origin, made by Electronic Arts' ("EA") is quite new service, released in 2010. Because this software is needed to play games published by EA, there are 30 million users of Origin. The estimated number of people who bought games and are regularly playing through this service is just around 4.4 million.[45]

The third major player is Amazon. Amazon as the largest online retailer is also offering digital games for download, but the number of games bought and users getting video-games cannot match Steam or Origin.

There are also digital games and digital content for consoles, but it is not as used as for computers. The digital content for consoles is handled by the producers of the consoles. Sony (PlayStation console), Microsoft (Xbox console) and Nintendo (Wii console) distribute some titles through their consoles. But in general, the number of games the player can choose from is limited.[46]

### *1.6.3. Console Manufacturers*

Consoles are on the market for a long time and currently, the 8th generation started in the end of year 2013 with Sony's PlayStation 4, Nintendo's Wii U, and Microsoft's Xbox One. As can be seen on Figure 18 (Appendix 1), since November 2013 up until January 2015, sales for all three consoles are rising. The leader is PlayStation 4, with the amount of sold consoles almost the same as Xbox One with Wii U together. In the end of January, the

[44] Saed, S. 2015. *Steam has over 125 million active users, 8.9M concurrent peak*. Retrieved on December 2015 from http://www.vg247.com/2015/02/24/steam-has-over-125-million-active-users-8-9m-concurrent-peak/

[45] Greenspan, D. 2013. *Mastering The Game - Business and Legal Issues for Video Game Developers*. Geneva, Switzerland. ISBN 978-92-805-2475-8, p. 19

[46] Greenspan, D. 2013. *Mastering The Game - Business and Legal Issues for Video Game Developers*. Geneva, Switzerland. ISBN 978-92-805-2475-8, p. 20

sum of consoles which were sold for each brand is: PlayStation 4 passed 19 million pieces, Xbox One sold more than 11 million and Wii U hit more than 9 million.[47]

As for monthly sales, PlayStation outsold Xbox and Wii each month for last 15 months. Wii was winning against Xbox just for three months. The Figure 19 (Appendix 1) shows the amount of monthly sales and also how they change during the year. It is clearly visible, that the sales are on their peak right before Christmas, after which they rapidly decrease for all consoles. The average sales of PlayStation 4 is above 600 000 pieces, Xbox One average monthly sales are more than 317 000 pieces and Wii U monthly sales are little bit higher than 164 000 pieces.[48]

It is worthy to mention, that there is a possibility that the console market will change soon, because Valve created a new console, named Steam Machine or Steam Box (Appendix 1, Figure 20). The console itself is smaller than regular PC and little big bigger than Xbox One. Steam is trying to bring computers to the living room TV, so they can compete with other consoles. The prices will vary, depending on the hardware used inside the console. The lowest price should be around $450, which is comparable to PlayStation 4 and Xbox, but the high-end Steam Box with best hardware should cost around $1400. The console will run on SteamOS, new operating system software based on Steam. The console won't use any disc for games, just digitally downloaded content. To be as much competitive as possible, Valve also created a new type of controller, which is different from what PlayStation and Xbox have. The console should also be available to In-home streaming, playing videos, music, movies, TV, sharing your account with family and much more.[49]

[47] D'Angelo, W. 2015. *PS4 vs Xbox One vs Wii U Lifetime Sales – January 2015 Update - PS4 19.05M, Xbox One 11.3M, Wii U 9.14M – News*. Retrieved on December 2015 from http://www.vgchartz.com/article/253113/ps4-vs-xbox-one-vs-wii-u-lifetime-salesjanuary-2015-updateps4-1905m-xbox-one-113m-wii-u-914m/

[48] D'Angelo, W. 2015. *PS4 vs Xbox One vs Wii U Lifetime Sales – January 2015 Update - PS4 19.05M, Xbox One 11.3M, Wii U 9.14M – News*. Retrieved on December 2015 from http://www.vgchartz.com/article/253113/ps4-vs-xbox-one-vs-wii-u-lifetime-salesjanuary-2015-updateps4-1905m-xbox-one-113m-wii-u-914m/

[49] Techradar. 2015. *Valve Steam Machine release date, news and features*. Retrieved on December 2015 from http://www.techradar.com/news/gaming/consoles/valve-steam-box-release-date-news-and-features-1127072

### *1.6.4. Mobile*

The smart phones and tablets became very popular and also, they became a good platform for gaming. The revenue generated is increasing rapidly, and so, the mobile games are the fastest growing segment in video-game market. In 2012, the revenues were above $9 billion. In 2013, the revenues reached more than $13 billion and in 2015, they should reach approximately $22 billion. In the last 3 years, the segment's revenues improved by 2.5 times. The biggest players in mobile market are Apple and Samsung. Apple has iOS, which is on all iPads and iPhones and Samsung has Android OS, which is made by Google. Android OS in on most phones and tablets from different manufacturers, but it is led by Samsung. Behind these two big companies, there are few small ones, which are still trying to get a piece of the market. Those are BlackBerry and Microsoft's Windows Phone. As smartphones are entering each corner of the world, also thanks to the hardware improvements the phones are going through, they are more capable of displaying sophisticated and more-quality games and content.[50,51]

[50] Greenspan, D. 2013. *Mastering The Game - Business and Legal Issues for Video Game Developers*. Geneva, Switzerland. ISBN 978-92-805-2475-8, p. 21

[51] Stamford, C. 2013. *Gartner Says Worldwide Video Game Market to Total $93 Billion in 2013*. Retrieved on December 2015 from http://www.gartner.com/newsroom/id/2614915

## 1.7. World Biggest Players

### *1.7.1. Top Video-game Companies by Video-game Revenues*

There are hundreds of companies, which are producing games, but only few of them have incomes bigger than billion dollars. These Video-game companies rankings are based on relevant published data, which publicly listed companies, need to provide at the end of each year. As for companies, which are private or their data is not available, the list includes estimates. In the data, hardware and non-game sales are already excluded. The data are without the last quarter (Q4), as for the data is not yet available.[52]

Table 3: *Top 10 Companies by Game Revenue, Worldwide, September 2015 (Millions of Dollars)*

| Rank | Company | Q1 | Q2 | Q3 | Q4 | Total Revenue | Total 2014 Revenue |
|---|---|---|---|---|---|---|---|
| **1** | Tencent | 2147 | 2092 | 2312 | 0 | 6551 | 7211 |
| **2** | Microsoft | 1846 | 1463 | 1517 | 0 | 4826 | 5023 |
| **3** | Sony | 1318 | 1115 | 1411 | 0 | 3843 | 5121 |
| **4** | Activision Blizzard | 1278 | 1044 | 990 | 0 | 3312 | 4409 |
| **5** | EA | 1185 | 1203 | 815 | 0 | 3203 | 4453 |
| **6** | Apple | 993 | 1096 | 1102 | 0 | 3191 | 3472 |
| **7** | Google | 675 | 722 | 771 | 0 | 2169 | 2362 |
| **8** | NetEase | 501 | 621 | 820 | 0 | 1942 | 1586 |
| **9** | Warner Bros | 386 | 727 | 622 | 0 | 1735 | n/a |
| **10** | King | 570 | 490 | 480 | 0 | 1539 | 2260 |

Source: *https://newzoo.com/insights/rankings/top-25-companies-game-revenues/*

[52] Newzoo. 2015. *Top 25 Companies By Game Revenues*. Retrieved on March 2016 from https://newzoo.com/insights/rankings/top-25-companies-game-revenues/

### *1.7.2. Top Countries by Video-game Revenues*

The table below contains the top ten countries based on their global game revenue estimates for year 2015. These estimates are based on combination of multiple data, such as transactional data, census data, consumer research and also company reports. The revenues exclude hardware sales, online gambling, business to business services and tax and are based on consumer revenues generated by companies in global Video-game industry. Slovakia is ranked 56th, with more than 4.5 million internet population and total of more than 63 million US Dollars revenue.[53]

Table 4: *Top 10 Countries by Game Revenue, Worldwide, December 2015*

| Rank | Country | Population | Internet Population | Total Revenues in US Dollars |
|---|---|---|---|---|
| **1** | China | 1 376 049 000 | 726 554 000 | 22 227 194 000 |
| **2** | U.S.A | 321 774 000 | 287 537 000 | 21 962 491 000 |
| **3** | Japan | 126 573 000 | 115 751 000 | 12 328 860 000 |
| **4** | South Korea | 50 293 000 | 42 664 000 | 3 978 476 000 |
| **5** | Germany | 80 689 000 | 71 175 000 | 3 654 669 000 |
| **6** | United Kingdom | 64 716 000 | 59 933 000 | 3 533 493 000 |
| **7** | France | 64 395 000 | 55 110 000 | 2 460 172 000 |
| **8** | Canada | 35 940 000 | 31 785 000 | 1 811 271 000 |
| **9** | Spain | 46 122 000 | 36 524 000 | 1 564 223 000 |
| **10** | Italy | 59 798 000 | 39 144 000 | 1 505 800 000 |

*Source: https://newzoo.com/insights/rankings/top-100-countries-by-game-revenues/*

[53] Newzoo. 2015. *Top 100 Countries By Game Revenues*. Retrieved on March 2016 from https://newzoo.com/insights/rankings/top-25-companies-game-revenues/

### *1.7.3. Top 10 Highest Grossing Video-games*

Not every published game is successful, and even if it is, only a few games earned billions of dollars for their publishers. The top ten video-games in table below are the games which generated the most revenue in the history of Video-games industry. Because some of the games were published around year 1980, all the data are adjusted to the inflation in 2015.[54]

Table 5: *Top 10 Highest Grossing Video-games, Worldwide, 2015 (Millions of Dollars)*

| Name | Year Published | Revenue |
|---|---|---|
| **Space Invaders** | 1978 | 13 900 |
| **Pac-Man** | 1980 | 12 800 |
| **Street Fighter 2** | 1991 | 10 600 |
| **World of Warcraft** | 2004 | 8 400 |
| **CrossFire** | 2007 | 6 300 |
| **Wii Sports** | 2006 | 6 100 |
| **Lineage** | 1998 | 5 700 |
| **Wii Fit** | 2007 | 5 000 |
| **Donkey Kong** | 1981 | 4 400 |
| **Dungeon Fighter Online** | 2005 | 4 000 |

*Source: http://bgr.com/2015/07/09/highest-grossing-video-games-of-all-time/*

[54] Siegal, J. 2015. *Believe it or not, these are the 10 highest grossing video games of all time*. Retrieved on March 2016 from http://bgr.com/2015/07/09/highest-grossing-video-games-of-all-time/

## 1.8. Possible Future Development of Video-game Industry

### *1.8.1. Virtual Reality (VR)*

There are few possibilities how video-game industry will continue and develop, but the biggest possible future development for video-games is virtual reality. Virtual reality already exists. 3D movies are in existence for more than 100 years, but the technology behind virtual reality is expensive and is still in its beginnings. Computers are on their way to get to the level of graphics, which looks almost real, yet there are already few devices capable of creating virtual reality.

With the improvement of hardware, virtual reality started to show in gaming industry as possible future of gaming. The most know device is Oculus Rift. It is special headset, a VR head-mounted display. The user puts the device on his head and connects it through USB ports to the computer. The device tracks head movement and rotation to provide 3D imaginary world around the user. The device has display and it also has sound. So, when playing a game, a person can feel like he is in the game. Because what he sees, is not the monitor in front of him, but the game world around him.

This device is the start of virtual reality and there are many projects ongoing, which can move the reality further, like device where the user is tied, but can move freely on the same space. This way, he can run, jump, crouch, while his movements are being monitored. If connected to the game, that person does not need to use keyboard or mouse to move in the game, because the device transforms his real-life movements into movements within the game. When combined with Occulus Rift headset, the person feels like he is in a real game, as he can move freely and sees the world in the game around him.

Still, this industry which is tied to video-games is only developing, starting and as the technology advance will continue, more virtual reality projects and devices will appear. The questionable thing in virtual reality is what the border is. So people do not stop living in the real world and do not live some alternate video-game lives which are not real. Because with graphic improvement and technology it can happen that the two realities start to merge and nobody can now foresee, if this development is something beneficial for the humanity or not.

### *1.8.2. Augmented Reality (AR)*

Augmented reality is very similar to virtual reality, yet there are differences. The main difference is that in virtual reality the person is in a completely different world, thinking he

is in a game. Virtual reality replaces real world with simulated and created one. Augmented reality is an indirect view on real world, in real time. It uses computer-generated video, graphics or GPS data to track person's position and according to that, the device, such as smartphone modifies the reality and shows it modified on screen.

This way, person perception can be enhanced or changed. People need to use some console or device with a screen and camera. Camera is capturing the surrounding and device is transforming the final screen with some augmentations. One augmented reality device was released by Google and was called Google Glass, but was not successful. There are concepts for augmented reality, mostly for smartphones or tablets. Theoretical concepts for glasses or contact lenses which alter persons view on world are already created, but there is no technology available, how to create and implement these concepts.

Augmented reality can be also used in gaming. There are already few games, which use augmented reality. People use their smartphones and camera to capture surrounding in real-time and on screen appears what they need to do, where to go or what to shoot. In addition to games, such devices can be used to show the way to hotel, show news, important information or warnings. By tracking GPS location, device position, what the device is recording through camera and numerous other conditions, the device can show anything in real-time, information about buildings, people, technically anything that is programmed.

As with virtual reality, augmented reality is in cradle, but the expansion, development and improvement of smartphones and tablets are allowing to this possible video-game industry to develop. There is the ethical and security issue, as recording surroundings and using augmented reality can be misused. Masses wearing glasses with cameras and augmented reality can be potential source of almost infinite data, which could be misused and would need to be protected. In the age of digital technologies this is hard to do, because everything digital can be hacked and not every time, antiviruses and similar software can help or prevent it.

### *1.8.3. Cloud Gaming*

Cloud gaming comes from cloud computing, which means instead of storing and accessing data and programs in personal computer's hard drive, they are stored and accessed over the Internet. The technology of cloud is on the market for many years and video-game industry is starting to use it. As with any other data, which are stored online

and can be accessed by people through device they own, be it computer, console, phone or tablet, video-game companies are starting to link cloud and their games. As internet and its speed are becoming more global and faster, it is starting to be easier to implement cloud. With cloud implemented, video-games will be as easy to access as are movies and music now.

Video-games now need to be regularly updated, as their content is improving, they are being balanced, they have data discs or people switch computers and need to reinstall them. Some companies already started with storing personal information in cloud, such as game progress, character levels and other game content. Few years back, all these information were only saved in personal computers within the game files and if person wanted to play on different machine, he had to copy the files over.

If cloud gaming is used, games would be installed and updated in cloud. People would not need to do anything to access the game from any device, not install or update their own files on their devices. All they will need is fast and reliable internet. This would also make games more accessible and cheaper.

As with virtual reality and augmented reality, this segment of video-game industry too is only in cradle. Companies are just starting to create and test cloud gaming on small games and trying to make it viable for everyday use. It will take many years for this segment to be reality, fully working and implemented, but there are numerous possibilities what can be done if it will be working.

# 2. GOAL OF THE STUDY

## 2.1.The Main Goal

The main goal of my thesis is to analyze players of video games, how much time they are spending on video-games and how much money they spend. This analysis and evaluation will be shown with real data I acquired from video-game survey and video-game company.

### *2.1.1. The Partial Goals*

As partial goals, I want to compare data, which was gathered from people in survey and compare it between all responders and only players, as well as to data from United States. I want to make different analyses based on the questions from my survey and propose a hypothesis for each of them, as following:

1) Age analysis

**Hypothesis 1:** More than 50 percent of players of video-games are less than 20 years old

2) Gender analysis

**Hypothesis 2:** More than 75 percent of players of video-games are men

3) Income analysis

**Hypothesis 3:** More than 75 percent of players of video-games earn less than 1000 Euro gross

4) Time spend

**Hypothesis 4:** More than 50 percent of players of video-games spend more than 2 hours playing video games daily

5) Money spend

**Hypothesis 5:** Less than 50 percent of players of video-games are spending money monthly on video games

# 3. METHODOLOGY OF WORK AND METHODS OF OBSERVATION

For completing this diploma thesis, I used appropriate procedures, methods of observation, which helped me to fulfill the set objectives. The main objective of this thesis is to show the breakdown of video-gaming industry and the breakdown of data gathered from people, which are playing video-games.

For the purpose of better understanding and explanation, I divided the thesis in two main parts; the theoretical part, where I focus on history, current situation, definitions and theory, where I used English sources, webpages and literature. The second part of the thesis is the analysis of acquired data from video-game company and video-game survey. For this part I used empirical methods such as survey (questionnaire), measurement, observation and also statistical methods, such as analysis, logical analysis and modeling to explain the data and put them into charts and tables.

## 3.1. The Characteristic of the Objects of Observation

In this thesis, there are two objects of observation. The first object is a real life company, which provided me the necessary data to work with. The data provided are within a period of one month and contain countries in which people play the game, what number of people joined the game, the gender of people and daily active users. The data also contains revenues for the selected time period.

The second objective was to gather data from regular people to see, how much they play, how much they spend on video-games, how much money they are willing to pay for video-game. In order to obtain the necessary information I created a survey, collected data from 150 people and proceeded to analyze the information they provided me with. The whole survey with questions and possible answer choices can be found in Appendix 2 – Video-game Survey.

## 3.2. Used Methods of Observation

The procedure of work was made by multiple, following steps. For start, it was necessary to gather and review all available information about video-game industry. To make as objective picture of the topic as possible for understanding the operation and trends in the market, I gathered scholarly publications which I read through and used as

sources. Since the topic and industry is quite new, there was no suitable Slovak literature, thus all sources are foreign. Also, in addition to such a literature, I added multiple appropriate internet sources and materials.

To analyze the data from the company and also from the survey, I used excel. Through contingency tables, graphs and pie charts I will be able to show, how the gaming is in reality and compare the results.

I also used analysis method, by which I analyzed small parts of the data gathered, to simplify the calculation and also understanding of the correlation between the individual data. I used mathematical-statistical methods, which helped to calculate individual results. For better transparency of whole work, I constructed tables, graphs, charts, which reflect the data in visual form.

Comparison was also used in comparing different results. It was applied for gender differences, day peak averages and for differences between age groups.

## 3.3. The Acquired Data

The video-game companies keep their data about players hidden from public, treat them as confidential data and rarely release them to public. It is possible to get yearly financial reports of such companies, but these reports do not contain specific games the company produced, how many people are playing the games or how much money the company earned for each of its games.

I was able to acquire data for *TrainStation* game from PIXEL FEDERATION. The data is for the dates from 11$^{th}$ December 2015 to 8$^{th}$ January 2016, so for one month. The data contains countries around the world, where people joined the game. It also includes the number of people from all countries that joined the game each day. The data also contains also gender distribution of people, which joined the game each day, as either male, female or anonymous. Because the game is accessible only through Facebook and Google+, the game system can only distinguish male or female players which joined these two social websites and selected their gender there. If the gender is not selected, the game system automatically counts the account as anonymous. The data acquired were not consistent for each day, because in some small or developing countries, when nobody connected to the game, country was missing in the data. The data for 29 days I acquired had more almost 13000 lines, so each day contained around 450 lines of information.

# 4. RESEARCH RESULTS

## 4.1. Video-game Company

The company PIXEL FEDERATION was grounded in year 2007 as a studio for game development for internet browsers, tablets and mobile phones. The headquarters of the company is in Bratislava, Slovakia, where more than 150 employees are creating entertainment for people all around the world. For now, there are 4 games available, accessible on different web and mobile platforms in more than 200 countries. The portfolio consists of games *TrainStation*, *Emporea*, *Diggy's Adventure* and *Big Shopkeeper*. The company is focusing on creating complex games, which bring joy and challenge for the players and in the same time, while allowing playing the game simultaneously with friends. Some of the games are accessible on diverse platforms, so that player can play one game on different devices. All games created by this company are free-to-play. That means, the players do not need to pay to play the game, but the game contains in-game options, where the players can spend money.[55]

The data I acquired is for the casual web browser game *TrainStation*, which is accessible through Facebook or Google+ (Appendix 1, Figure 21). As the name suggests, the game is about trains. In fact, the players can build an entire train empire. The player is unloading and loading trains to gather resources, through which he can build up train station or buy and upgrade trains. Resources in the game are free and players do not need to pay anything. If the player builds an object, such as a new train or station, it takes minutes, sometimes hours in real life to be available in the game. Some people do not mind waiting, but for those unwilling to wait, the game has a specific type of resource in the game, called gems, which can be bought for money. Some trains or stations have specific requirements such as player level, high amount of resources and long building time. All these requirements can be overcome with gems. When the selected item in the game is paid with gems, it does not need any other resources and the building time is 0. Different items cost different amount of gems. The game is not forcing the players to buy gems, but impatient players can use this option. The game itself also has bundles for the gems. As shown on Figure 22 (Appendix 1, Figure 22), there are 4 bundles available for sale.

[55] Pixel Federation, 2015. *About the Company*. Retrieved on March 2016 from http://www.pixelfederation.com/sk/company/?setLanguage=1

This way, even if the game is free-to-play and people do not need to spend anything to play it, it still generates income for the company, as there are numerous people who are impatient or want to be better outcompete their friends or other players and they buy the bundles to gain access to "gems". Also, because there are thousands of people playing this game each day, there are numerous advertisements as you can see on bottom and right side of the capture (Appendix 1, Figure 21). Other companies pay to PIXEL FEDERATION to include their advertisements in their games. This is the second way, how free-to-play games generate income for the companies which produce them.

## 4.2. Video-game Population Survey

To have more detailed information about people and their relation to video-games, I created a small survey and send it to my friends. The point of the survey is to gather data from as many people as possible. The gender, age, income or education does not play a part, because the purpose of the survey is to analyze, how many people play video-games, how much money they spend, how much time do they play on what type of machine or the genres they prefer.

Video-game industry is young industry and it is still developing as new technologies are entering into human lives. That is also the reason, why mostly younger people tend to spend time with video-games than older generation. In addition to that, they are more proficient with technologies and are willing to spend more money for a good game. This was another reason to make this survey, to support or disprove this hypothesis.

The survey itself had only ten questions. It was made this way to gather as much data for the topic as possible, without being too complex or being too long, because people dislike long surveys and avoid answering them. Each question had multiple answers, out of which responders had to choose one, which was fitting them the most. The last two questions were multiple choice questions. The whole survey with questions and possible answers is in Appendix 2.

The following part of the thesis is a breakdown of data collected from the survey. First four questions were analyzed in two ways. First, it is a statistical analysis of all people who answered the survey. Second, after filtering out people, who are not playing video-games, the analysis included only the people who are playing video-games. These two groups will be compared in first four questions. For the questions number 5 until 10, only people who play video-games are analyzed, because these questions are about video-games.

The survey was made through Survey Monkey, an online survey creator which lets you download the data. Then, it was shared through friends and their friends. There was no targeted group of people, but only people on internet answered the survey, that is why it can be biased. Still, I have gathered 150 responses for this survey and the analysis will be made out of these responses. Interestingly, out of 150 people, only 28 are not playing any video-games, so 18.6 percent of questioned people. That is unexpected as I was expecting higher number of people, which do not play any video-games.

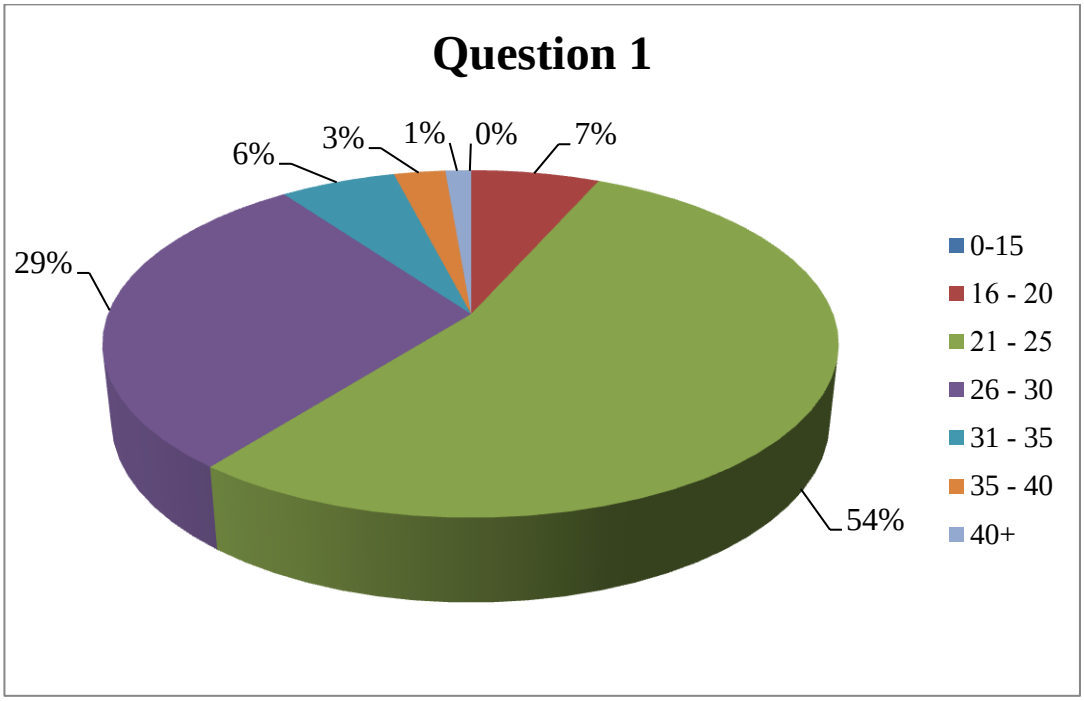
I will try to compare data acquired from PIXEL FEDERATOIN with data acquired from the survey. Not every question from the survey will have direct comparison with data from the video-game company. In cases, when the data cannot be directly compared, but focuses on the same topic, I will mention them separately. Also, an U.S. Entertainment Software Association ("ESA") is publishing yearly essential data, which are focused on gaming habits of U.S. citizens and these data will be as well compared to the results from my personal survey.

## 4.3.Results

### *4.3.1. Question 1: Your Age?*

The first question in the survey was the question about age. Answers to choose from were age intervals, mostly spanning 5 years. On Graph 1 below the breakdown of age groups and their percentages is shown. The age was divided into seven categories. There were zero answers from people in age group 0-15 years. The biggest group were young people from age 21 up to 25 making up more than half of all survey responses. Second biggest group are people from 26 to 30 years. These two groups together are 83 percent of all answers in the survey. The fact is that people over 30 years who answered this survey make only 10 percent of all answers, which is quite a low number.

Graph 1: *Question 1: Your Age?*

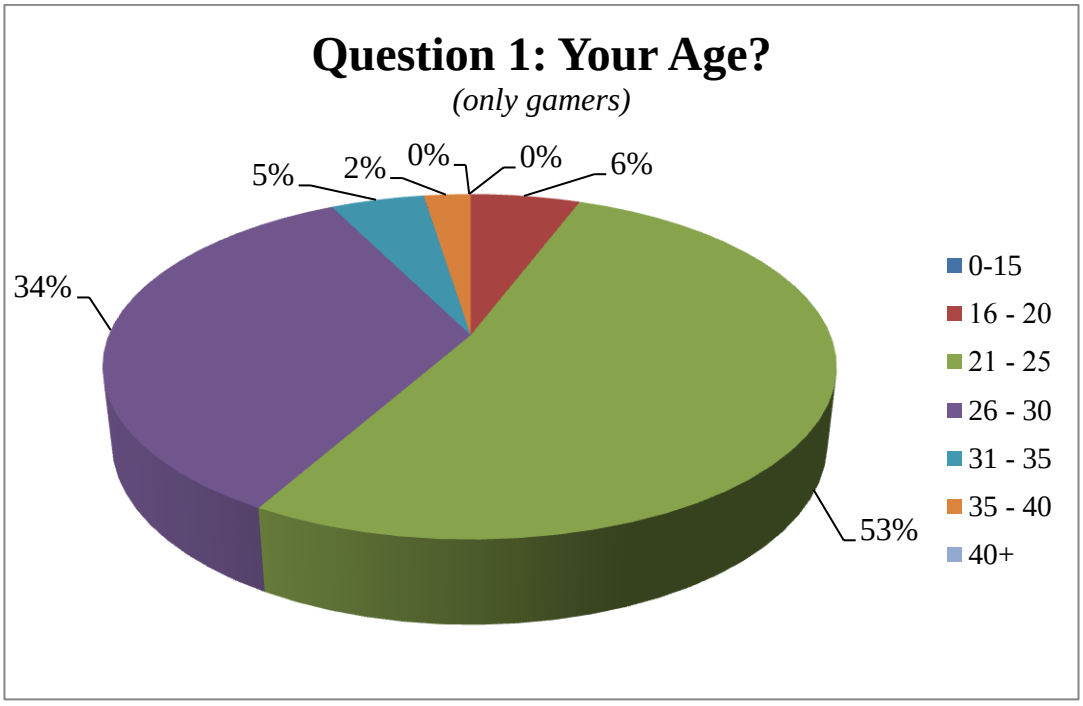



*Source:* *Own Processing*

The Graph 2 below is the same Question 1 from the survey, but the people who do not play video-games are excluded. There were zero people playing games in two categories, the 0-15 and people over 40 years. That is why the categories are missing in the pie chart. The biggest category is the same as in Graph 1, which are people from age 21 to 25. Also, the second biggest group remained the same and both these two groups together take up 87 percent of all people from the survey which plays games. **My first hypothesis was that**

**more than 50 percent of players of video-games are less than 20 years old.** This is not true for results from my survey, as only 6 percent of gamers are younger than 20 years.

Graph 2: *Question 1: Your Age? (only gamers)*




*Source: Own Processing*

In U.S. ESA is responsible for boosting and fortifying video-gaming industry and is making regular market survey and statistical demographics. According to ESA, the average game player is 35 years old. It is different result than in my survey, where the average age is the age group 21-25 years old. As explained above, the difference can be because of multiple circumstances. Also, the demographics, culture, approach to technologies and life are different in U.S. and in Slovakia. That can also influence the difference between U.S. survey and my survey. ESA also states, that 26 percent of players are under 18 years old and 27 percent are over 50. In my survey, there is group of people under age 20, and only 6 percent of players fall into this age category. In contradiction to the U.S. study, there were no players above age 40.[56]

The *TrainStation* data does not contain data about age, as in Facebook and Google+ it is not necessary to write age and so, it is impossible for the company to possess such kind

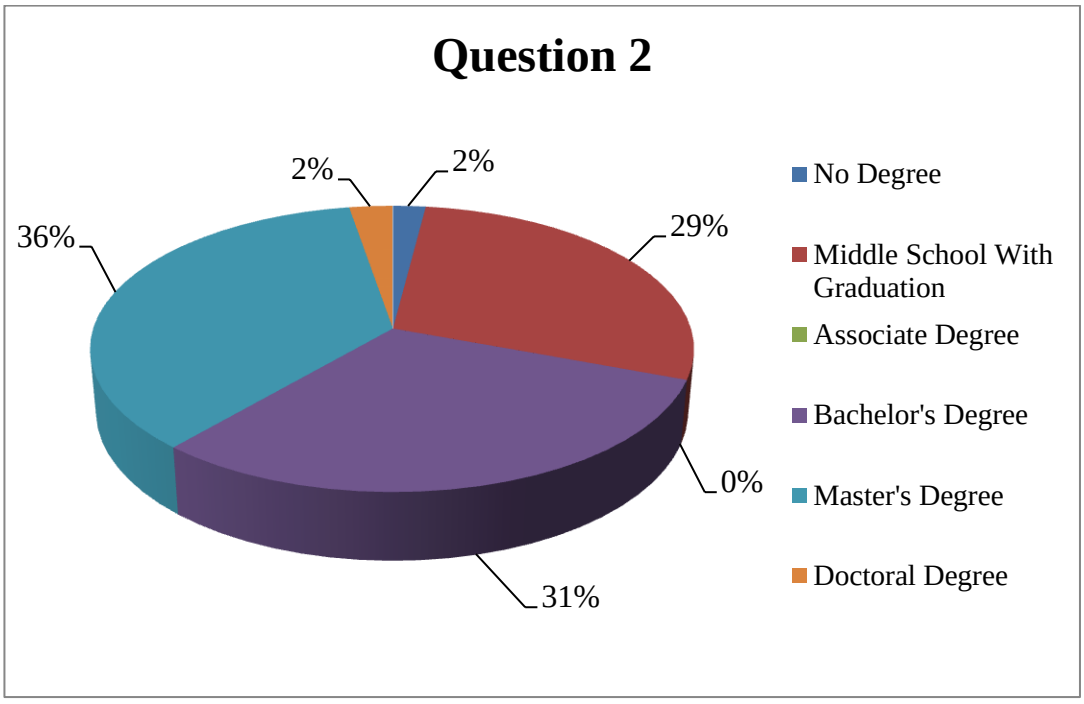
[56] Entertainment Software Association. 2015. *The 2015 Essential Facts About the Computer and Video Game Industry.* Retrieved on April 2016 from http://www.theesa.com/about-esa/esa-annual-report/

of data. Because of that, it is not possible to compare with my survey, what age groups the players playing *TrainStation* belong to.

### *4.3.2. Question 2: Your Degree?*

The second question was about each person's Degree. This question was necessary, as it is interesting to know if achieved Degree has any influence on people in terms of playing video-games. In Graph 3, the detailed breakdown of possible Degrees is shown. The survey included six possible answers for this question. The answers are visibly two sided. First side is No Degree, Associate's Degree or Doctoral Degree, where almost no answers are at all. Second side is Middle School with Graduation, Bachelor's Degree and Master's Degree, where 96 percent of all answers are divided almost evenly between these three options.

Graph 3: *Question 2: Your Degree?*

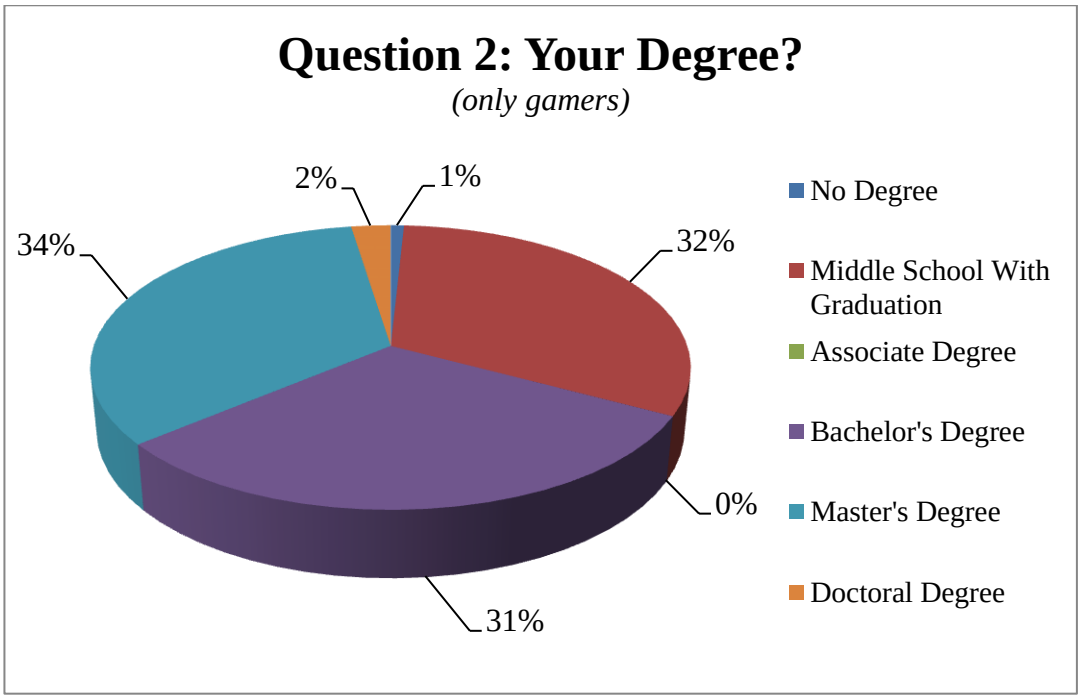



*Source: Own Processing*

To have a better view on only people who are playing games regularly, on Graph 4 below are the achieved Degrees of players. The pie chart is not very different from the one, where non-players are also included. There were no people with Associate Degree. From all the people, who answered the survey, just 1 percent of gamers have no Degree and only 2 percent have Doctoral Degree. So the rest 97 percent of respondents fall within the three main categories, which are Middle Scholl Degree, Bachelor's Degree and Master's Degree. On the pie chart it is visible, that Middle School Degree people increased by 3 percent and Master Degree people decreased by 2 percent in comparison to pie chart,

which included also non-gamers. These changes are too small to evaluate properly, as the differences between the three bigger categories are in range of 1 to 3 percent.

Graph 4: *Question 2: Your Degree? (only gamers)*




*Source:* *Own Processing*

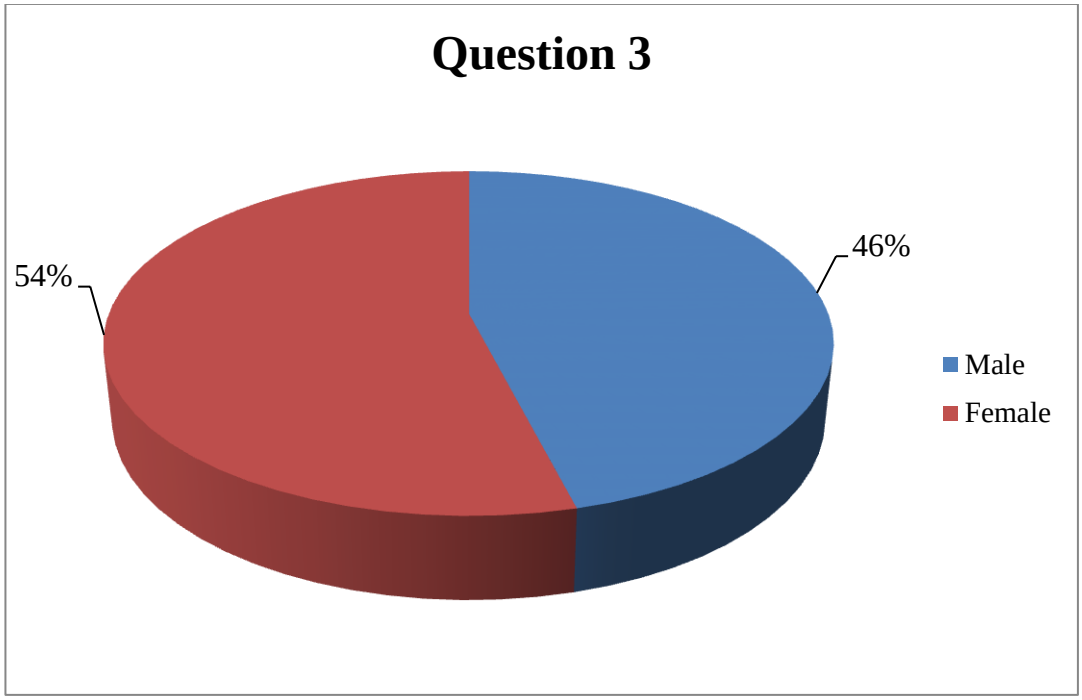
The ESA is not including any data about the Degree achieved by the gamers in the U.S. in their survey and statistics, so I have no data where could I compare if the statistics I have from my survey is similar or at least follows a similar pattern or it is specific for Slovakia. From the results gathered, there is minimal percent of people without Degree or with Doctoral Degree that would spend their time with playing video-games.

The *TrainStation* data does not contain the Degrees, as in Facebook and Google+ it is not necessary to write education and so, it is impossible for the company to possess such kind of data. Because of that, it is not possible to compare it with my survey, what education the players playing this specific game have.

### *4.3.3. Question 3: Your Gender?*

Third question in the survey was about gender. The question was needed, as it is necessary to know the ratio between male and female players which answered the survey and then also to know the ratio between male and female gamers. On the Graph 5 below is the breakdown of people who answered the survey. There were more females, who answered the survey than the male responders.

Graph 5: *Question 3: Your Gender?*

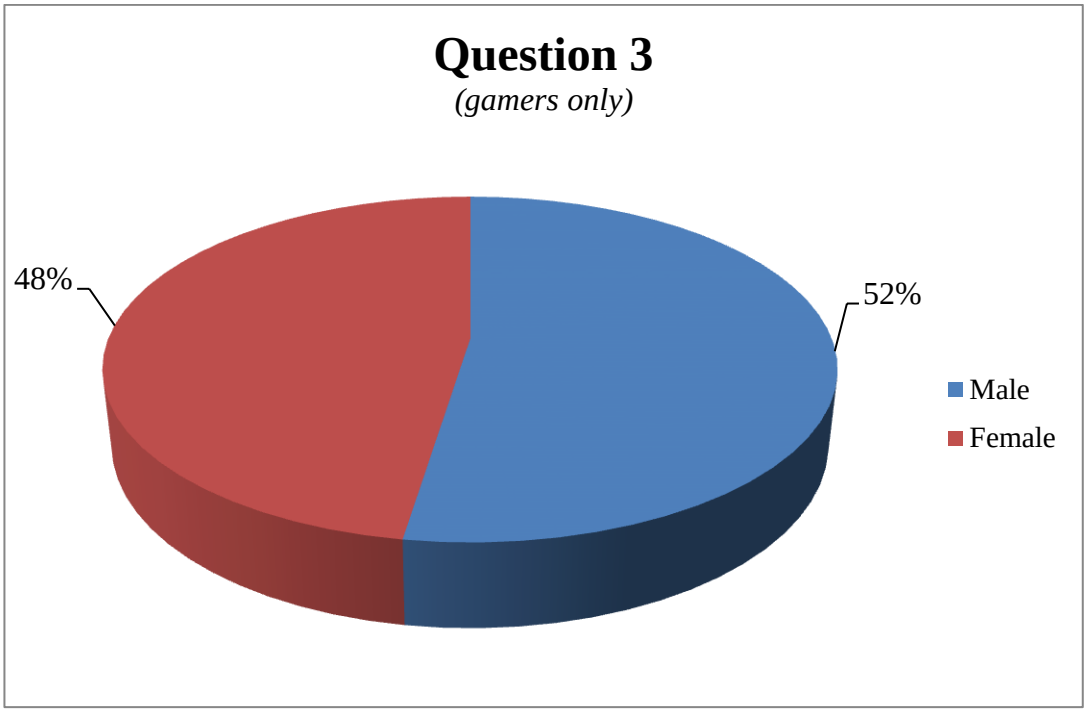



*Source: Own Processing*

After the exclusion of non-gamers, the pie charted did change. On the Graph 6 below, the distribution of male and female players is shown. In Graph 5 above, the survey consisted of 54 percent female responders and only 46 percent male responders. This shows that females are more likely to fill out survey than male people, but it does not show anything about players. So the Graph 6 below shows only gamers and it is visible the numbers are reversed. From the responders who play games, 52 percent are male and 48 percent are females. This fact that men play more than women is widely spread public opinion, but it is surprising that female gamers are as numerous as male gamers. My survey shows that the male and female players are almost equal, because the difference between them is only 4 percent. **My second hypothesis was that more than 75 percent of players of video-**

**games are men.** This hypothesis was also disproven, as the ratio of male-to-female players was almost the same, 52 percent to 48 percent.

Graph 6: *Question 3: Your Gender? (only gamers)*




*Source: Own Processing*

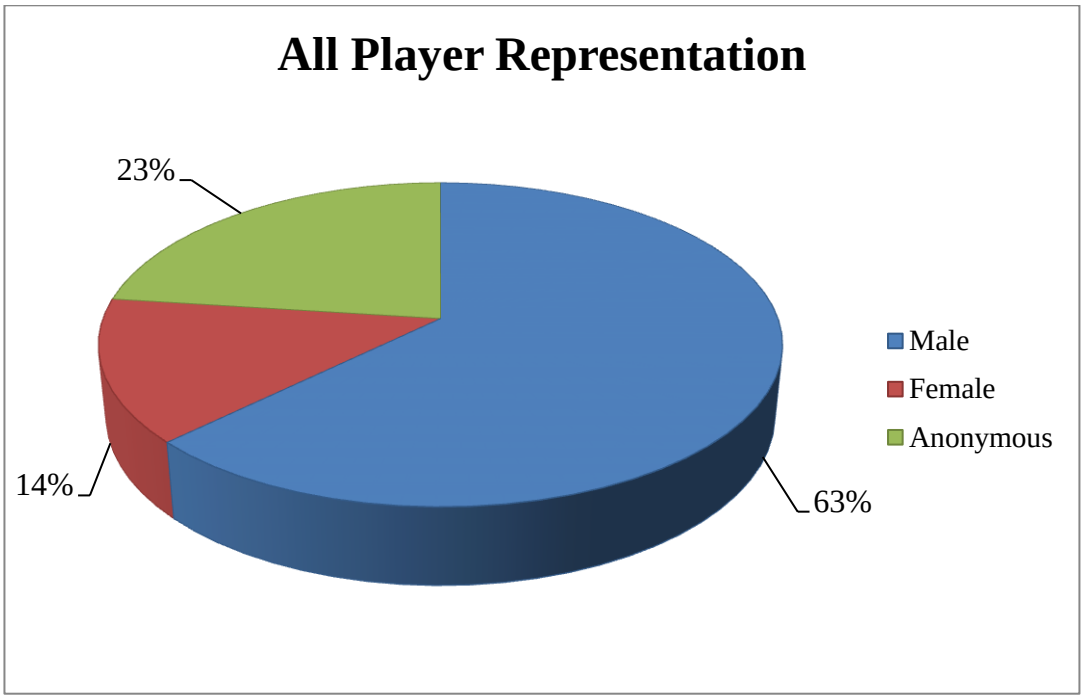
The U.S. ESA states in their survey that 56 percent of players are male and 44 percent are female. This is very similar numbers to my survey, as the differences between U.S. data and Slovakia data are really low, only 4 percent. According to ESA, the most frequent game purchases, only 41 percent are made by females and 59 percent of the purchases are made by males. Also the most frequent female game player is on average 43 years old and the average male game player is 35 years old. As I do not have enough data to support or disprove these two statements and statistic data made by ESA, I cannot agree or disagree with them. I can only argue that more than half of the answers in my survey were people in ages 21 to 25 and so the average for male and female players in my survey cannot be 35 and 43 years, respectively.[57]

The *TrainStation* is a game about trains, so there was an expectation that the male population will be greater than female. On Graph 7 below, in the All Player Representation

[57] Entertainment Software Association. 2015. *The 2015 Essential Facts About the Computer and Video Game Industry.* Retrieved on April 2016 from http://www.theesa.com/about-esa/esa-annual-report/

in *TrainStation game*, 63 percent of players were male players. It is because male population regularly plays with such toys as trains and cars since they are young and these desires do not change much. There are 23 percent of unknown genders in anonymous, which can be all male, or all female, or distributed evenly.

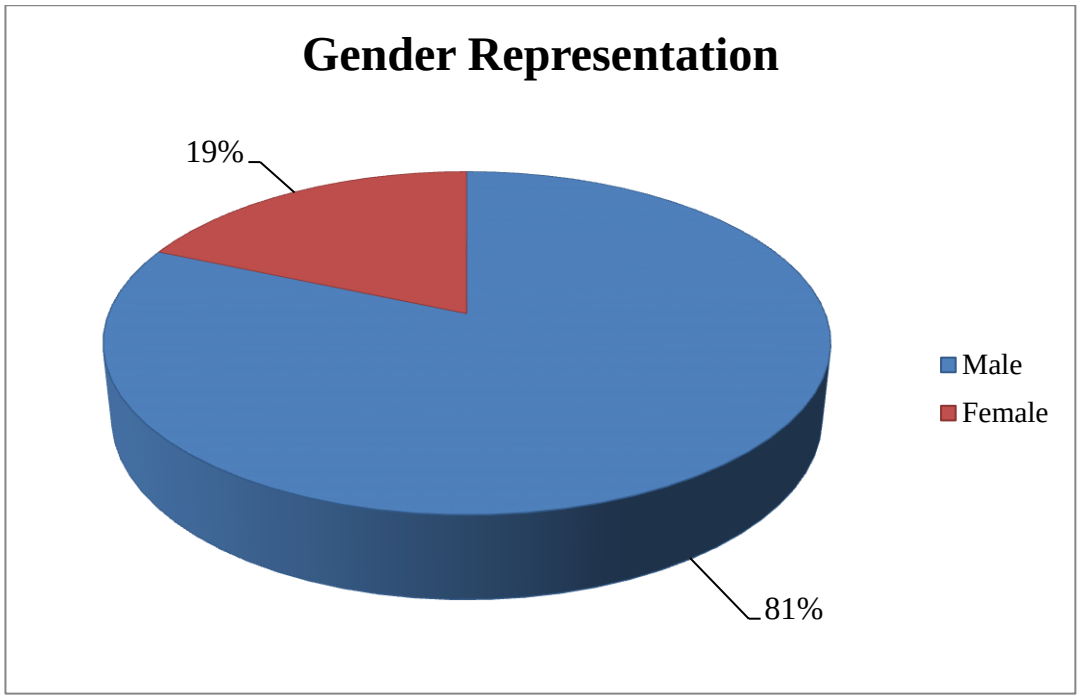
Graph 7: *All Player Representation for TrainStation*




*Source: Own Processing*

That is why Graph 8 is without this group of players and shows only male-to-female ratio of players. The male population for this game is more than 4 times larger than the female population. That is probably because the targeted group of players is male players.

Graph 8: *Gender Representation for TrainStation*




*Source:* *Own Processing*

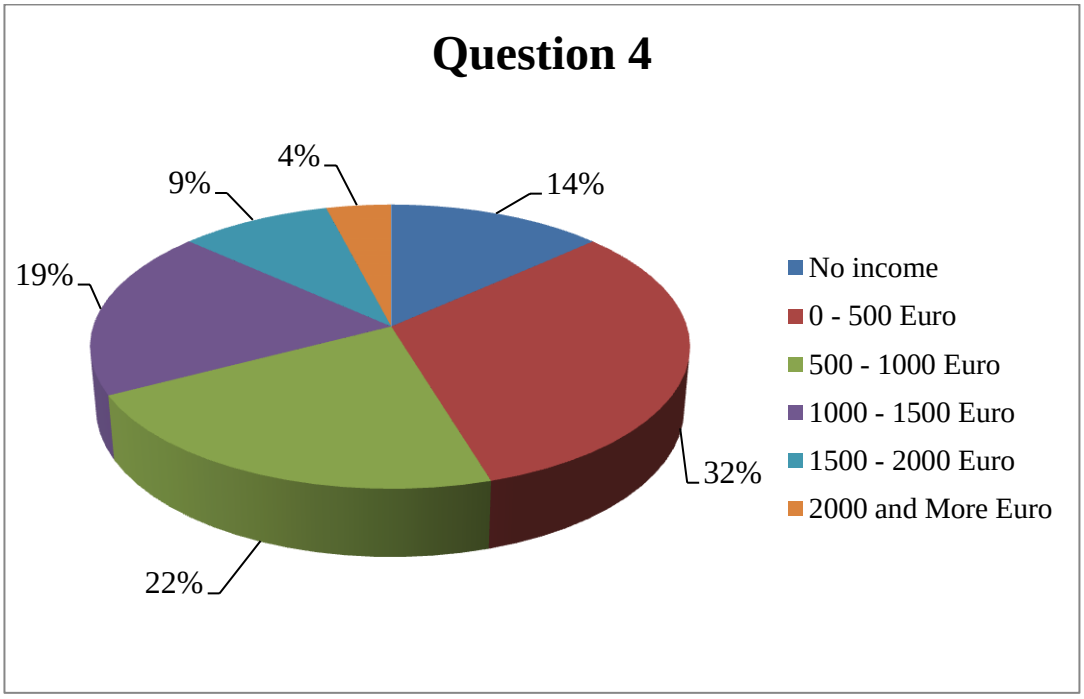
When compared to the results from the video-game survey, it is clear that the population for *TrainStation* is different than the average distribution of males to females as the results of my survey and also U.S. ESA is showing. My survey and ESA are showing very similar distribution, almost even, but the *TrainStation* is skewed out of these two sources of data. As expected, the possible reason for these big differences; 29 percent more male players and 29 percent less female players for *TrainStation* than the 52 percent and 48 percent for male and female players, respectively, in my survey is, that the game is about trains and about building stations for them. And so, it is not so attractive for the female population, which prefers different genres of games.

### *4.3.4. Question 4: Your Income Range?*

The fourth question in the survey was about salary income range. As people do not want to and in many cases cannot speak about their salary, even though the survey was anonymous, I made income groups with ranges by 500 Euros. Responders could choose one out of 6 possible options, starting with No income, and then were the 5 groups for people with income. The responders have taken their gross salary and according to that selected specific group where they belong. As for the average Slovak gross salary is under 1000 Euro per month, the last group was for people earning 2000 Euro and more, as the 2000 Euro per month salary is not very common.

In the Graph 9 below is the breakdown of responders' income ranges. The biggest group, 32 percent of responders, belongs to 0 to 500 Euro income group. Second biggest group of responders, 22 percent earn between 500 to 1000 Euros per month. Third biggest group, 19 percent of responders, earn from 1000 to 1500 Euro per month.

Graph 9: *Question 4: Your Income Range? (Gross Salary)*

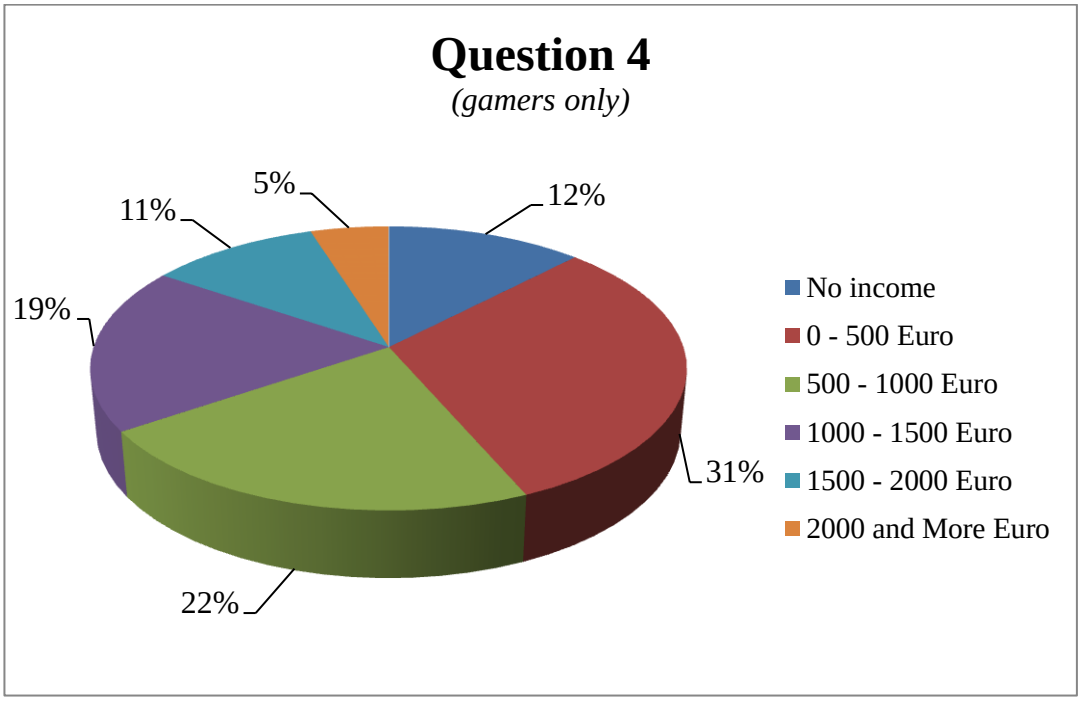



*Source: Own Processing*

After filtering non-gamers out, the income Graph 10, which is below, almost have not changed from the Graph 9 above, where also people who do not play are included. Changes are very minimal. The biggest category of income range, 0-500 Euro fell down by 1 percent from 32 percent to 31 percent. Also No Income category fell down by 2 percent.

But the number of people in the top income categories increased. The 1500 to 2000 category and the 2000 or more Euro category, both increased by 2 and 1 percent, respectively. The biggest part of gamers, 53 percent earn from 0 to 1000 Euro. If taken into account that 53 percent of gamers are people in age 21 to 25, it can be said that it is mainly them who contribute to this category of income, as it is people, who mostly study and have a part-time job, or ended school and started working, while starting salaries are not above 1000 Euro per month. Only 12 percent of gamers have no income and 16 percent of questioned gamers are earning more than 1500 Euro. **My third hypothesis presumed that more than 75 percent of players of video-games earn less than 1000 Euro gross**. This hypothesis is wrong, as only 53 percent of players are earning less than 1000 Euro.

Graph 10: *Question 4: Your Income Range? (Gross Salary)*




*Source:* *Own Processing*

U.S. ESA did not contain question about salaries in their research and questionnaire, so there are no data available to compare results from my survey. According to Eurostat, statistical office of European Union, the average gross salary for 2014 was 862 Euro for Slovakia. On Graph 9 above is visible, that 22 percent of gamers earn average Slovakian

salary. If the 1000 to 1500 Euro per month salary group is added, 41 percent of gamers earn average Slovakian salary or more.[58]

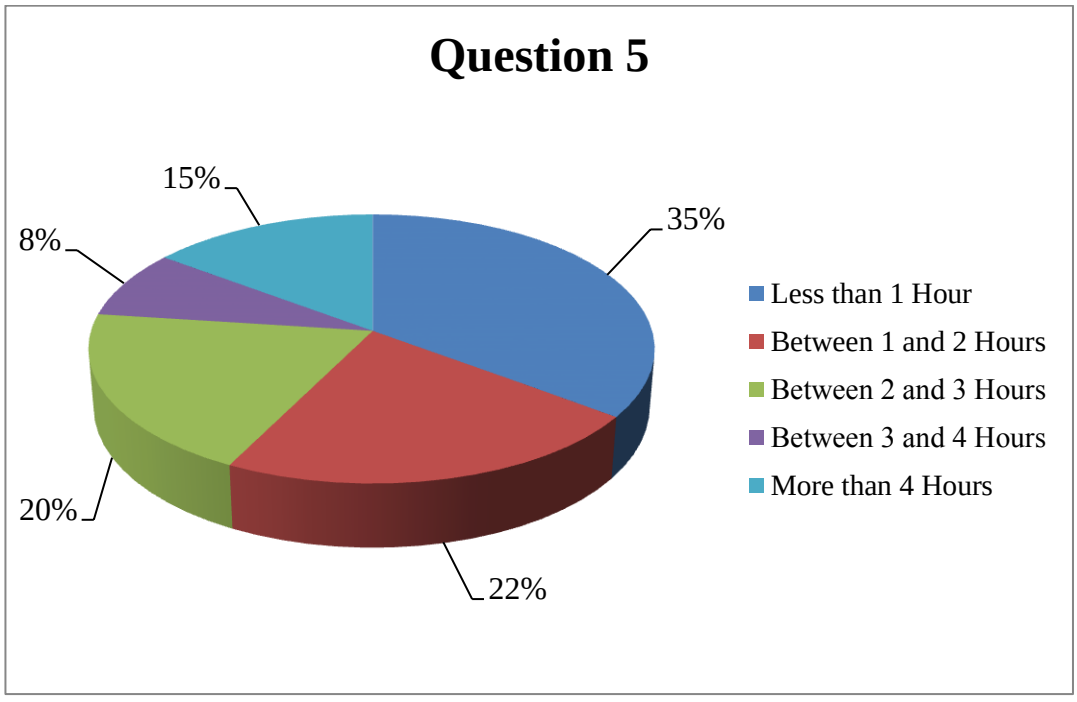
The *TrainStation* data does not contain the salary ranges, as in Facebook and Google+ it is not necessary to write personal income and so, it is impossible for the company to possess such kind of data. Because of that, it is not possible to compare it with my survey, what salaries the players playing this specific game have.

[58] Poštová banka, a. s.. 2016. *Priemerná čistá mzda na Slovensku vlani dosiahla 665 EUR, vo Švajčiarsku presiahla 5 tisíc EUR*. Retrieved on April 2016 from https://www.postovabanka.sk/novinky/analyzy-trhu/zaujalo-nas/priemerna-cista-mzda-na-slovensku-vlani-dosiahla-665-eur-vo-svajciarsku-presiahla-5-tisic-eur/

### *4.3.5. Question 5: How Many Hours per Day You Play Video-games?*

Fifth question in the survey was about how much time people spend each day to play video-games. On the Graph 11 below, the breakdown of players is shown. The biggest group of players, 35 percent, is people who play less than one hour each day. Second group, 22 percent of questioned people, spends between one to two hours each day to play some video-game. The interesting group is the last one, people who play more than 4 hours each day. They are 15 percent of all questioned people. And, they play at least 4 hours, probably even more. So, they spend at least 28 hours a week to play video-games. Compared to the first group of players, the 35 percent one, who spend 1 hour or less each day, that is less than 7 hours of time per week, which is a vast difference in time spent to play. **My fourth hypothesis presumed that more than 50 percent of players of video-games spend more than 2 hours playing video games daily**. This presumption is not right, as only 43 percent of players play more than two hours each day, but this hypothesis was not far from truth.

Graph 11: *Question 5: How Many Hours per Day You Play Video-games?*



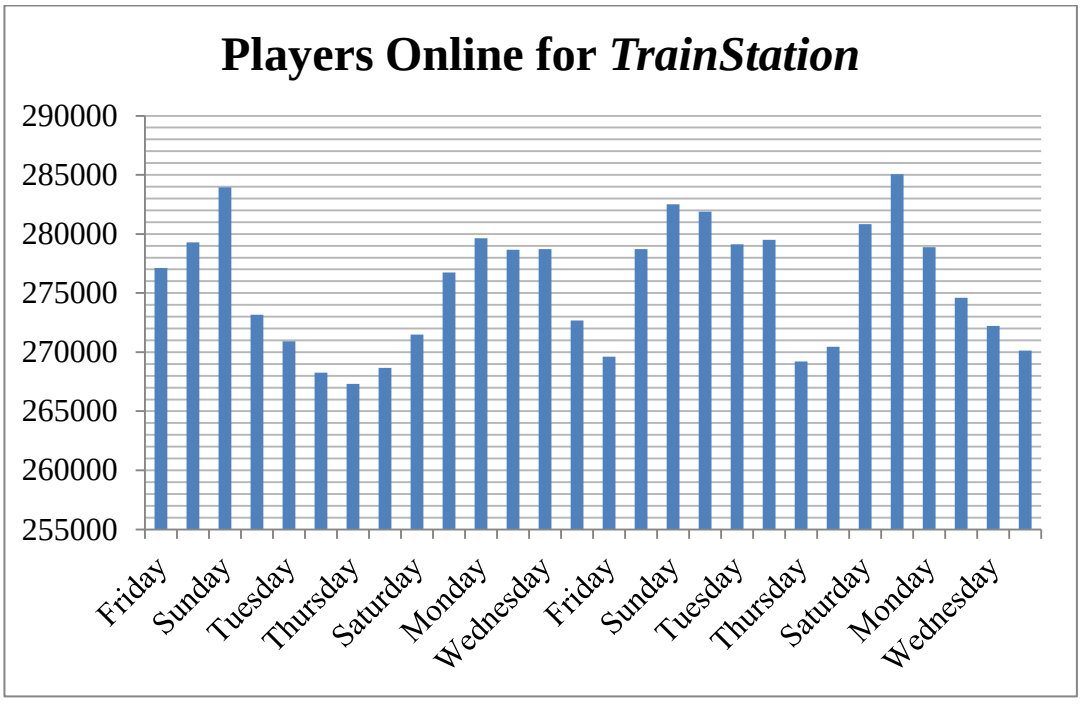

*Source: Own Processing*

According to U.S. ESA, 42 percent of Americans play for at least 3 hours per week. Also, frequent players say they spend 6.5 hours per week playing with others online and 5 hours playing with others in person, that is 11.5 hours of gaming per week. According to

my study, 35 percent of questioned people play less than one hour per day, so less than 7 hours per week. The people, who play from 7 to 14 hours each week, so on average 10 hours, are in the second group and they contribute with 22 percent of players.[59]

The data from PIXEL FEDERATION did not contain the amount of time the players were online in the game. But, the data did contain the average number of people online for each day. My survey did not contain question from which I could conclude, if people questioned are playing more during weekends or during working week. It is possible to deduce it from the data acquired from *TrainStation*. During the period examined, the daily average online players are above 270 000 people. As visible on the Graph 12 below, most people are online always during the weekend and much less online during the week. The least number of players were online on 17th December 2015, which was Thursday and the most people were online on 3th January, 2016, which was Sunday. It is very visible, that on weekends, there are regularly one and half, or even two times the number of players as during some days of the week.

Graph 12: *Online Players for TrainStation game*




*Source:* *Own Processing*

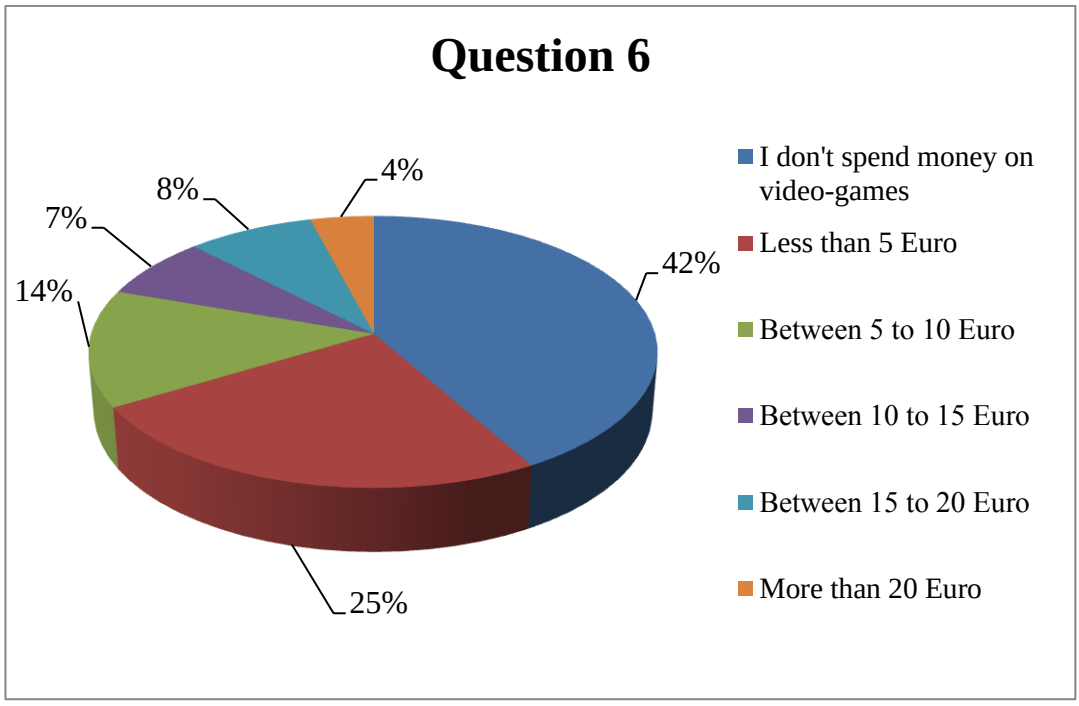
[59] Entertainment Software Association. 2015. *The 2015 Essential Facts About the Computer and Video Game Industry.* Retrieved on April 2016 from http://www.theesa.com/about-esa/esa-annual-report/

Nor my survey, nor U.S. ESA has any data available to number of hours played for each day in week. But from the data available from PIXEL FEDERATION, it can be concluded that people play more during weekend, when they have time, than during working week, when they have more work and responsibilities.

### *4.3.6. Question 6: How Much Money You Spend Monthly on Video-games?*

The sixth question in the survey evaluates how much money people, who play video-games spend each month. Below on Graph 13 is the breakdown of gamers and how much money they spend each month for video-games. The biggest part of the players questioned, 42 percent, answered, that they do not spend money monthly on video-games. Second biggest group of people, 25 percent of players, are people, who spend 5 Euro or less each month for video-games. Only small percentage of players, 4 percent, spends monthly more than 20 Euro for video-games. Two groups of players, people who spend between 10 to 15 Euros each month and group which spends 15 to 20 Euros each month, make only 7 and 8 percent of all players questioned, respectively. **Fifth hypothesis presumed that less than 50 percent of players of video-games are spending money monthly on video games.** This was disproven, as 58 percent of all players spend money monthly on video games.

Graph 13: *Question 6: How Much Money You Spend Monthly on Video-games?*



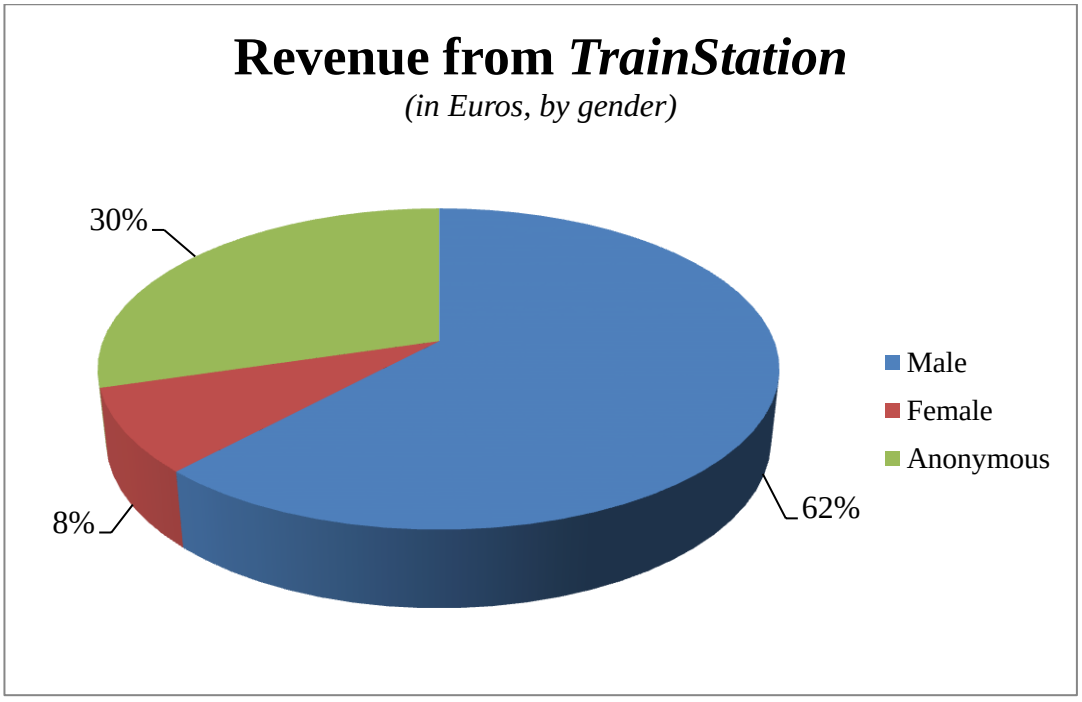

*Source: Own Processing*

The American ESA does not have information about how much money the players are spending. The only data they published are that players in U.S. spent more than $22.41

billion on games industry in year 2014. Outside of this data, they are not specifying how much money the gamers in U.S. are spending monthly or yearly.[60]

The *TrainStation* game data contains information about the revenues. Again, as with U.S. ESA which has only spending per year, these revenues are for period of one month and can be differentiated by gender or by day. For the period provided, his game generated more than 1,000,000 Euro incomes. In the Graph 14 below, is the breakdown of the revenues by gender. The income provided is just from the payments made by people which were playing *TrainStation* and not from the commercials. As written in *Question 3: Your Gender*, the biggest part of the *TrainStation* player base are male players, so also the biggest part of the income, almost 61.95 percent came from male players. The second biggest spenders were the anonymous players; slightly fewer than 30 percent and the last one were females, which accounted only for 8.45 percent of total revenues.

Graph 14: *Revenues from TrainStation by Gender*



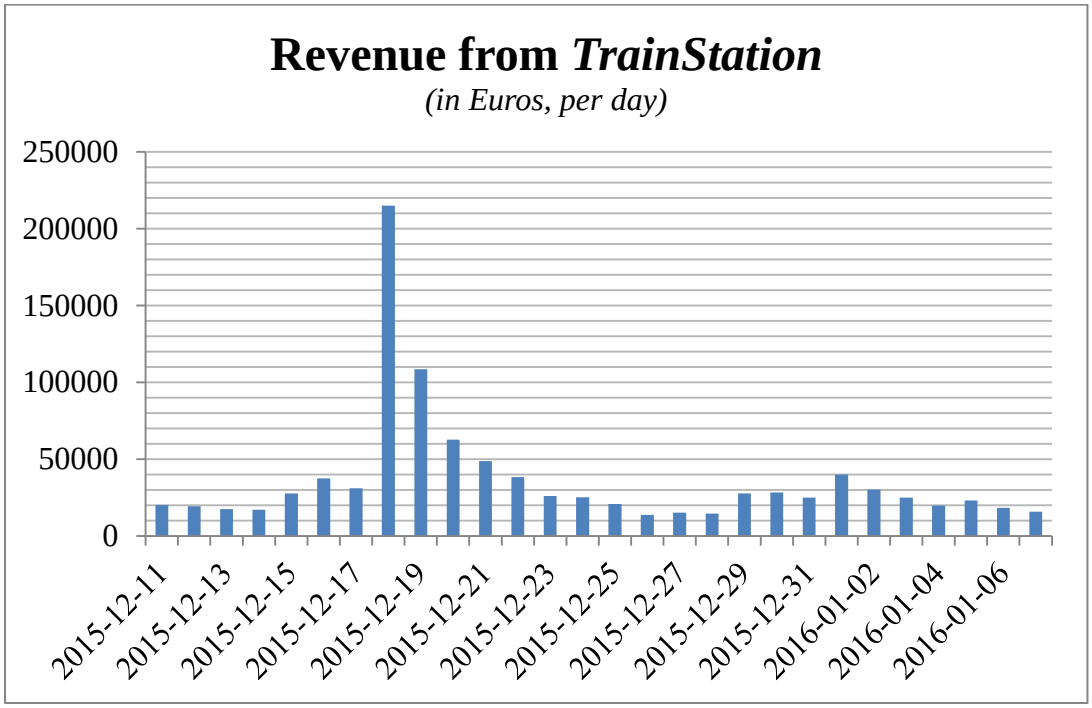

*Source:* *Own Processing*

The *TrainStation* game is not obtaining its income constantly and the income is fluctuating up and down during the period. In the Graph 15 below, the breakdown on

[60] Entertainment Software Association. 2015. *The 2015 Essential Facts About the Computer and Video Game Industry.* Retrieved on April 2016 from http://www.theesa.com/about-esa/esa-annual-report/

separate days and the amount of income for each day is shown. The revenues were stable at first, but on the 18th of December, there was a huge increase in the revenues. The following day, 19th of December, it fell down by half and then was slowly decreasing for the whole end of period, with one small increase on New Year, 1st January 2016. Since I was not provided with any information, why the 18th of December is a special day, nor do I have access to any previous data, I can only make assumptions. After 15th, most companies pay their employees and the employees get their income few days after 15th, based on the bank they use. 18th December was Friday and players got their income from work. That is the reason, I assume, why there is such a huge spike in revenues for one specific day during the whole month.

Graph 15: *Revenues from TrainStation*

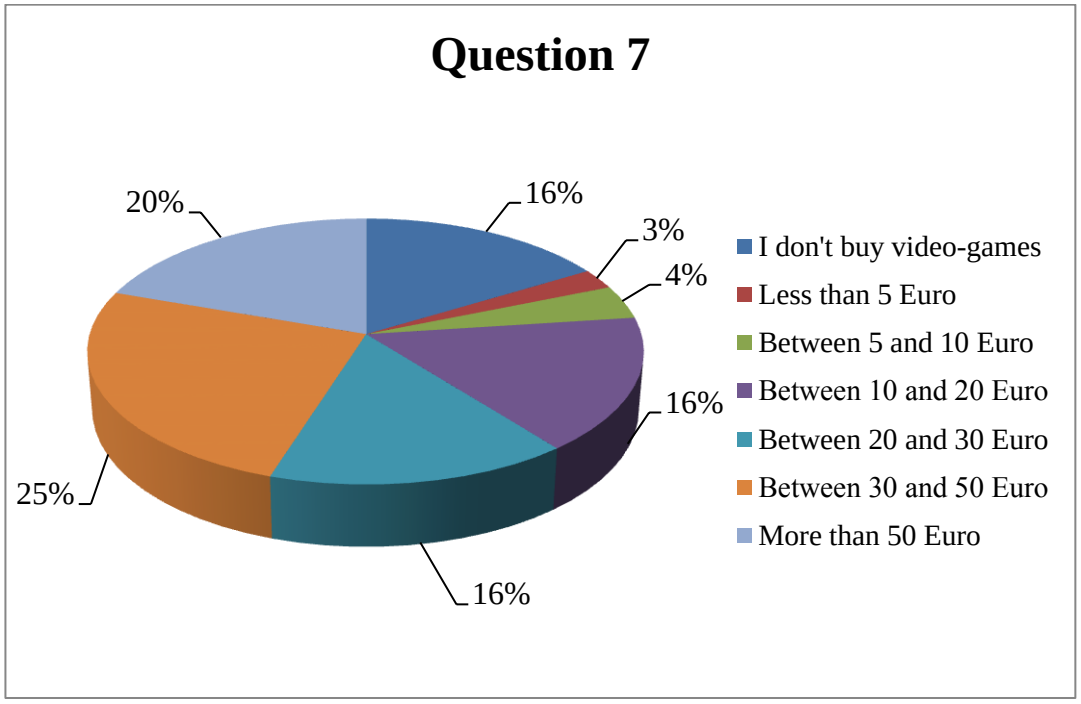



*Source:* *Own Processing*

### *4.3.7. Question 7: What is the Maximum Money You Would Spend for a Video-game?*

Seventh question was a question about the maximum amount of money the player would be willing to spend to buy a video-game. On the Graph 16 below is the breakdown of players and how much they are willing to spend. It is interesting to see, that the two biggest groups are players, that are willing to spend between 30 and 50 Euros and the second group even more than 50 Euros to buy a single video-game. These two groups make up 25 percent and 20 percent of questioned players respectively. The small percentage of players, 3 percent and 4 percent, are people who would spend less than 5 Euro, or would spend between 5 and 10 Euro, respectively. Why there are so few players, 7 percent combined, which would spend less than 10 Euro for a video-game is a mystery. Biggest chance is that they would download the game or just won't play it at all before spending any money.

Graph 16: *Question 7: What is the Maximum Money You Would Spend for a Video-game?*




*Source: Own Processing*

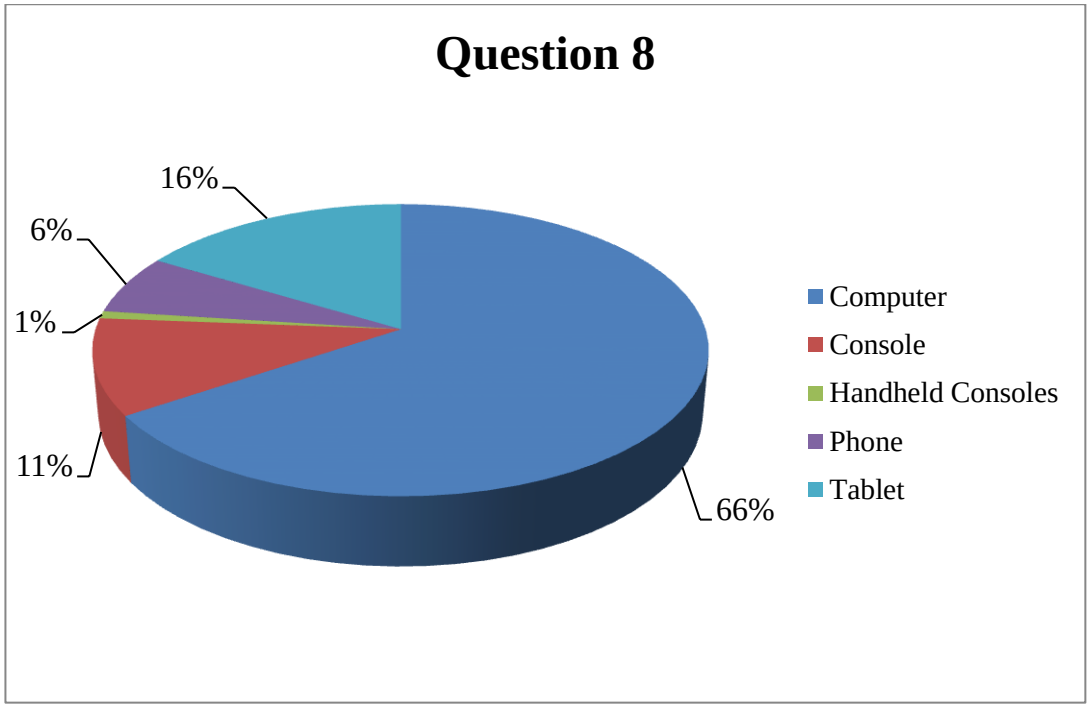
The ESA survey does not mention what amount of money are people willing to spend on purchasing video-games so I have no data I could compare to the statistics from my survey.

In the *TrainStation* game, the data available are only the prices, for which the packages of in-game currency are sold for. The amount of money people are willing to spend for a video-game cannot be compared to the data from *TrainStation*.

### *4.3.8. Question 8: What is the Device You Use Most to Play Video-games?*

The eighth question was an easy one and there were only five possible answers to it. The whole point of the question was to know, what media players from my survey use the most. Below is the Graph 17, which shows, what device most players use. Complete winner is the computer, which is used by 66 percent of all players. Second most used device for playing games, with 16 percent of players' responses, is tablet. People prefer tablet over phone because of the bigger screen and better specifications than most mobile phones have. Third most used device to play is a console. 11 percent of players from my survey use console to play video-games. Fourth is a phone, only with 6 percent of people using it over computer, tablet or console.

Graph 17: *Question 8: What is the Device You Use Most to Play Video-games?*




*Source:* *Own Processing*

Most people using mobile phone to play video-games are casual gamers, who only play when they are waiting for something, traveling in bus or similar scenarios. Last group, with only 1 percent of responders are handheld consoles. They are not used so much anymore, since the era of smartphones started. They were widely used before, as portable small game devices, but smartphones and tablets offer everything handheld consoles have,

plus much more, such as options to call, send messages, stores full of applications and gadgets and so on.

The American ESA has a lot of information about this topic. 51 percent of American households own a dedicated game console. Also they state, that four out of five households own a device that can be used to play video games. The top devices most frequent gamers use to play games in U.S. are computer with 62 percent, dedicated game console 56 percent, smartphone with 35 percent, wireless devices with 31 percent and as last dedicated handheld systems which had 21 percent. It looks like in ESA survey, people could choose multiple answers, but in my survey, people selected the device they play on the most. Still, difference between usage of computer and console in my survey is 55 percent but compared to U.S., the difference between computers and consoles for gaming is only 6 percent.[61]

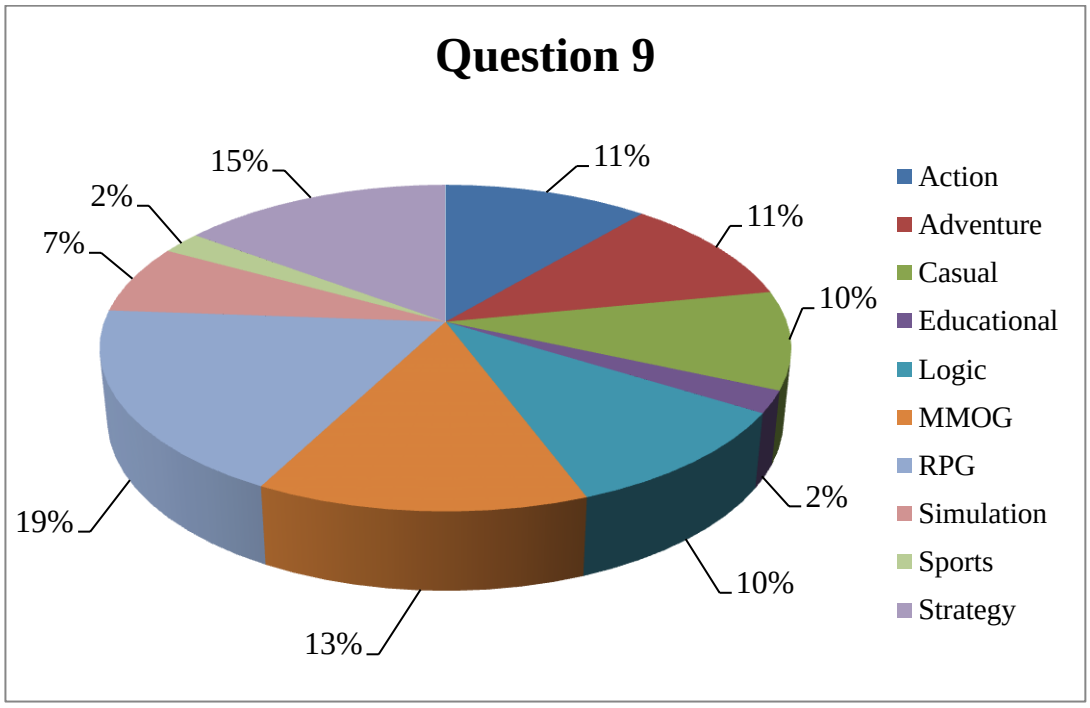
The *TrainStation* is a browser game, so it is only available through Facebook and Google+. So it can be only played through computers, telephones and tablets. The data from PIXEL FEDERATION do not specify, which device is used the most to play their game.

[61] Entertainment Software Association. 2015. *The 2015 Essential Facts About the Computer and Video Game Industry.* Retrieved on April 2016 from http://www.theesa.com/about-esa/esa-annual-report/

### *4.3.9. Question 9: What Kind of Genre You Play?*

Ninth question was about the types of games gamers prefer. As there are dozens of game genres, I had to select some categories which are most played and are general for people to distinguish between them. This question is a multiple choice question, as responders could select more than one answer. In Graph 18 below, is the breakdown of game genres. There is only one genre, which is above the rest, which are RPGs (Role Playing Games). They are the most preferred game, with 19 percent of pick rate. Second are strategy games, with 15 percent of pick-rate, closely followed by third MMOG (Massively Multiplayer Online Game) who got 13 percent of pick-rate. Next four types of games have almost the same pick-rate, 11 percent for action and adventure games and 10 percent for casual (social, browser, etc.) and logic games. After them, there is simulation with low 7 percent pick-rate. Also, there are two genres with very low picrate among all the genres available, these two are educational games and sport games, both with only 2 percent pick-rate.

Graph 18: *Question 9: What Kind of Genre You Play?*




Source: *Own Processing*

Out of these genres, action, adventure, MMOG, RPG, Simulation, Sports and Strategy are mostly games made for computers and consoles, as they take a lot of memory and call for certain system requirements to be played. Casual, educational and logic are mostly

found on mobile phones and tablets, because they do not need such intense requirements, graphics and other hardware, which is necessary to run the games.

According to ESA, among traditional game sales, the top genres in 2014 were action (28.2 percent) shooters (21.7 percent) and sports (13.3 percent). It is vastly different from my survey, as action games got only 11 percent pick-rate and sports had abysmal 2 percent of pick-rate. Shooter games are hard to categorize, as they can belong to multiple categories, such as action games, adventures, MMOG or RPG.

ESA is also stating that in U.S., the most popular genres among frequent players are social games, action and puzzles and that 39 percent of the most frequent gamers play social games. Frequent gamers are players, which play regularly each day, for longer periods of time, like hour, two or more. As can be seen on Graph 11, Question 5, players, who play 1 hour per day and more, make 65 percent of all responders who play games. As Question 9 was multiple choice, it cannot be said which genre of game people who responded to my survey prefer the most. Social games, or also called casual games have only 10 percent pick-rate in my survey. Action games have 11 percent and puzzles, which can also be categorized as logical games, have 10 percent.[62]

*TrainStation* is a casual game. Casual games represent 10 percent of games played by people in my survey. When compared to statistics from ESA, most popular genre are social games with 39 percent. Below, in the part *Country Analysis* is shown, that for *TrainStation*, the number of players from United States is 18 percent and that it is the biggest country in terms of player base for this game. This supports the data from ESA.

[62] Entertainment Software Association. 2015. *The 2015 Essential Facts About the Computer and Video Game Industry.* Retrieved on April 2016 from http://www.theesa.com/about-esa/esa-annual-report/

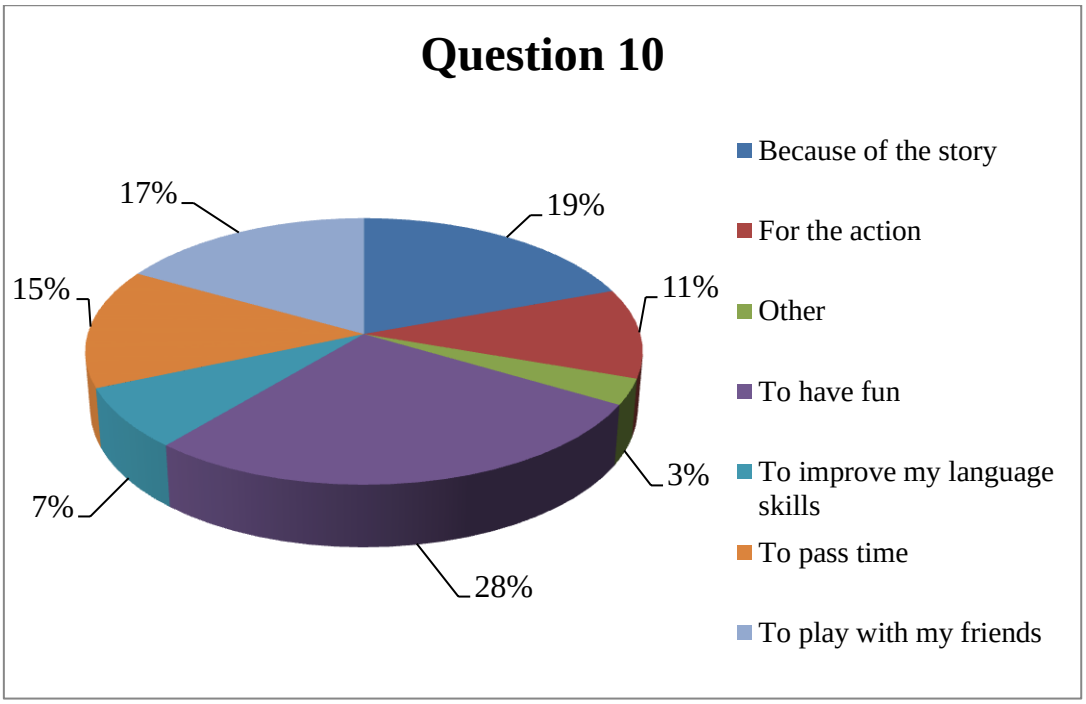
### *4.3.10. Question 10: If You Play Games, Why?*

The last, tenth question in my survey, was why players play games. What is the very reason they waste time with playing video-games, instead of doing something different. As with question 9, also this question was a multiple choice one. People could select more than one answer, not only the preferred reason. On Graph 19 below, you can see the breakdown of their answers. The most commonly used reason, which had 28 percent pick-rate, was 'to have fun'. People play games to have fun and not to be bored. Second most picked answer, with 19 percent of pick-rate, was 'because of the story'. The third most selected reason, very close behind the second with 17 percent of pick-rate was 'to play with my friends'.

That is why, as it can be seen on Graph 18 in Question 9 above, MMOG, RPG and strategy games have the biggest pick-rates. Because these types of games are usually multiplayer games, which are mostly played through internet with other people and players play it with their friends. The forth most selected category with 15 percent pick-rate was 'to pass time'. The fifth category, which was not as much selected, was 'for the action'. It has 11 percent of pick-rate and shows, that people want some action in their lives and if they are not getting it during regular days, they want to experience it at least through playing games.

Action games in question 9, in Graph 18 above had 11 percent pick-rate, so it corresponds with the pick-rate of this option of why people play video-games. Some people take video-games as possibility to learn and use them for 'improving language skills'. Pick-rate of this category was 7 percent. Many gamers do not realize this, but video-games are improving language skills. RPGs, MMOG and games with stories where people need to read the story and also interact with other people are mainly produced in English. People playing some adventure need to read what is happening and need to choose options based on what they have read through before. So even if they are not realizing it, they are improving their English language. Also, there are games made for tablet, mobile phones or computers, which are specially made for learning new foreign languages and they are starting to be popular. These games take learning new words and grammar in interactive, mostly funny way so people think of it as a game and learning foreign language is therefore easier for them. The last category was 'other' category. It was mainly for people, who could not select any of the previous categories or had other unspecified reasons, why they are spending their time on video-games.

Graph 19: *Question 10: If You Play Games, Why?*




*Source: Own Processing*

The American study made by ESA did not directly ask gamers, what their reason to play games is, as I did in my survey, but they asked parents for reasons to play with their children. There were multiple choices and also people could select multiple answers. The answers which got most percentages were "Its fun for the entire family" with 85 percent, "Because they're asked to" with 75 percent, "It is a good opportunity to socialize with their child" with 75 percent and that "They enjoy playing video games as much as their child does" with 54 percent. It is similar to my survey results, where the most chosen one was "To have fun". [63]

*TrainStation* data which I acquired from PIXEL FEDERATION did not contain any data related to why players of *TrainStation* play it.

[63] Entertainment Software Association. 2015. *The 2015 Essential Facts About the Computer and Video Game Industry.* Retrieved on April 2016 from http://www.theesa.com/about-esa/esa-annual-report/

### *4.3.11. Country Analysis*

My survey had no question for citizenship or from which country the responder is, because it was send through social media and my friends resent it to their friends. Most of my friends are Slovak nationality, so having almost all people writing Slovak as an answer for such question would not be effective. That is why I did not include such question in my survey.

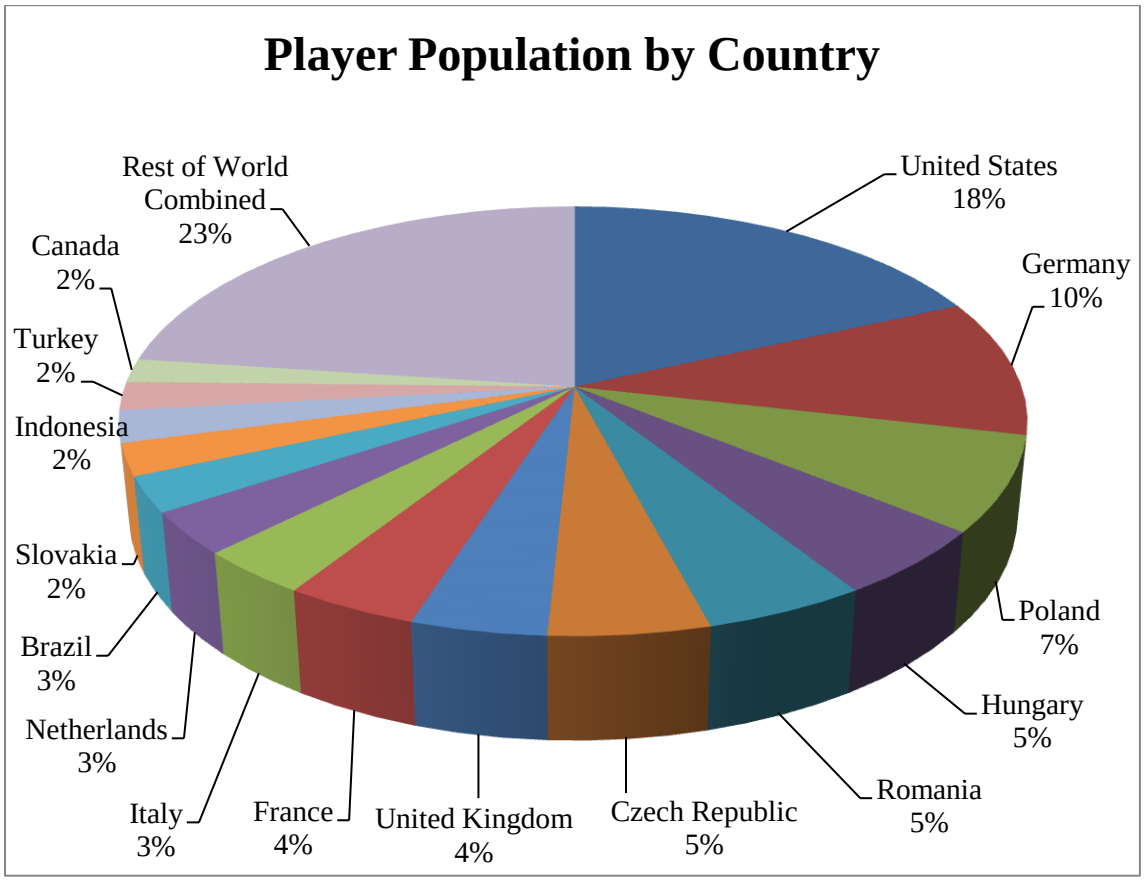
The U.S. ESA focuses in their survey only on United States and does not focus on other countries. Even though in U.S. there are numerous nationalities, people from all around the world, they did not ask in their survey about nationality.

On the other hand the PIXEL FEDERATION has the data, from which country the players are joining the game and how many players are joining. Even if I did not ask it in my survey, I have access to such data so I have analyzed them. The amount of people playing *TrainStation* is different across the world. What is unbelievable, it is played in 198 countries around the world, so in every country on Earth. In Graph 20 below, you can see which countries have the biggest representation of players in this game. Because 198 countries would not fit in the graph, I selected the top 15 countries, plus the rest of the countries combined. The top 6 countries have approximately 50 percent of the whole player population of *TrainStation* and the remaining 192 countries have the second 50 percent of players.

The leader is United States with 1 428 000 players per month. Second is Germany, with almost 810 000, followed by Poland with 562 000 players. The next three countries, Hungary, Romania and Czech Republic have almost the same number of players, which is 400 000 for Hungary and slightly less for Romania and Czech Republic. The following countries after Czech Republic are United Kingdom, France, Italy, Netherlands, Brazil, Slovakia, Indonesia, Turkey and Canada. In comparison to United States or Germany, these countries have quite small number of players, but in comparison to the 183 countries combined, the number of players in these is really high.

Even despite the fact that the game is not well known, has small player base and was made by a Slovak company, the biggest number of players comes from United States. The next nine biggest countries in terms of player base are in Europe.

Graph 20: *Player Population by Country for TrainStation*




*Source: Own Processing*

This agrees with the number of U.S. players playing casual games, as mentioned in *Question 9*. *TrainStation* is a casual game and the survey shows that most preferred type of game in U.S. is casual games. It matches with the United States as the biggest country in terms of player base in *TrainStation* game.

# 5. DISCUSSION

To have deeper analysis and understanding of video-game industry and how it works, I gathered data from PIXEL FEDERATION and their game *TrainStation* and also conducted survey about gaming habits of people. *TrainStation* is a browser game playable only through Facebook or Google+. The game is successful as it has thousands of players online each day and is generating revenue, which comes from in-game purchases of in-game currency. The survey consisted of ten questions. I analyzed data from video-game company and from survey and compared them together and with an U.S. Entertainment Software Association, which conducted survey about gaming habits in United States.

The analysis showed that young people play games and out of all responses, 83 percent of people were in the age between 21 years and 30 years. There can be multiple reasons this survey had that big number of young people, mainly because it was spread through social networks and it probably did not reach older audience. It is questionable, if my survey would reach all age categories, the average age category of gamers would be even higher. **My first hypothesis was that more than 50 percent of players of video-games are less than 20 years old.** This is not true for results from my survey, as only 6 percent of gamers are younger than 20 years. The hypothesis was based on the assumption that mostly children and young people play games and the older they are, they have responsibilities, work, families and they do not have as much time for games or grew up and playing is not attractive anymore. When compared to U.S. ESA results, most of them were different than the results obtained in my survey. The age was vastly different; average gamer in U.S. is 35 years old, while my survey shows average age around 23 years. Also, ESA data shows that 27 percent of U.S. gamers are over 50 years old, while in my study, there was no gamer above 40 years. The reasons for this can be multiple. The survey did not reach all age categories that are in the survey. Younger and older people did not want to answer the questions or are not playing games and thus found it meaningless to answer. People were lying about their age. People in these age categories are not so much on Facebook and the survey did not reach them. Also it is possible that my friends and friends of my friends do not have so much younger and older people, which would answer the survey. It can be combination of these possibilities.

The analysis of Question 2 showed that 32 percent of gamers have Middle School with Graduation and 31 percent of gamers have Bachelor’s degree. 34 percent of gamers have Master’s degree and only 1 percent had no degree at all. When combined with Question 1,

the reasons for this distribution could be that for Middle School with Graduation option having 32 percent and Bachelor's Degree having 31 percent are mainly people from age group 21 to 25 years, which are 54 percent of all answers gathered answered. These people are still studying and did not achieve higher degree than Middle School or Bachelor one. The second biggest group is people from age 26 to 30, which are 34 percent of all people questioned and they match the 34 percent of people with master's degree.

As for gender differences, there was almost no difference between U.S. and my survey. In U.S., 56 percent of gamers are male and 44 percent are female, compared to my survey where results show that 52 percent is male and 48 is female. The difference between these two studies was only 4 percent. It is different with percentages of gender representation on *TrainStation* game, which is probably caused by the theme of the game, which are trains, and so it is not appealing for female players as it is for male players, as there are 4 times more male players as female players. **My second hypothesis was that more than 75 percent of players of video-games are men.** This hypothesis was also disproven, as the ratio of male-to-female players was almost the same, 52 percent to 48 percent. This hypothesis was based on the presumption, that boys and men are more likely to play video-games than women. Also U.S. survey is disproving this second hypothesis. U.S. study was made on bigger population than my survey, but the results are very similar. The only result that corresponds with my hypothesis is *TrainStation* game, where 81 percent of players are male. That means that my hypothesis is true only for games, which are specifically targeting male gender.

35 percent of responders in my survey earn more than average Slovak salary, which was 862 Euro per month gross for year 2014. Also, 22 percent of questioned gamers earn from 500 to 1000 Euros gross, so that is around Slovak average salary. Only 12 percent of gamers said they do not have any kind of income, but 35 percent of gamers are earning more than 1000 Euro gross each month, out of which 5 percent are earning more than 2000 Euro each month. **My third hypothesis presumed that more than 75 percent of players of video-games earn less than 1000 Euro gross**. This hypothesis is wrong, as only 53 percent of players are earning less than 1000 Euro gross. This hypothesis was based on the first hypothesis that stated that more than 50 percent of players are younger than 20 years. Such people are students or started to work only recently and so it was unexpected for them to earn more than 1000 Euro gross. My first hypothesis was disproven, also this third hypothesis is disproven, as 47 percent of all players are earning more than 1000 Euro gross.

Most of the gamers from my survey play less than 1 hour, 35 percent and 42 percent play from 1 to 3 hours each day. Alarming are 15 percent of responders, who play for more than 4 hours each day. Thanks to analysis of data from *TrainStation* it is clear, that most people tend to play during weekends, when they have time and generally play a lot less during working week than they do during weekends. ESA is stating that 42 percent of Americans play for at least 3 hours per week, compared to 35 percent of responders from my survey, which play for 7 hours or less per week. Frequent players play on average 11.5 hours per week in U.S. and my survey shows that 22 percent of players play from 7 to 14 hours per week. **My fourth hypothesis presumed that more than 50 percent of players of video-games spend more than 2 hours playing video games daily**. This presumption is not right, as only 43 percent of players play more than two hours each day, but this hypothesis was not far from truth. The hypothesis was based on the fact that players devote most of their free time to video-games. These results can be biased; people could lie about the fact how much time they waste and devote to video-games or they lose sense of time during playing and are not aware how long they play.

People are not spending money monthly on video-games. 42 percent stated that they are not spending money at all. There can be multiple reasons for this kind of answer. First, they might not play games with monthly fees, where people need to play each month some specific amount of money to have access to that game and play, like *World of Warcraft*, which has monthly fee of 10 Euro. Second, they play those games, but on illegal servers, which are for free but not official. Third option is, they download the games illegally and play them at home without spending money on them. 25 percent said that they spend less than 5 Euro each month for video-games. This can be buying games in sales, thanks to which expensive games can be bought cheaply or they spend that money for some monthly fee. Still, 4 percent of responders wrote that they are spending more than 20 Euros each month for video-games. **Fifth hypothesis presumed that less than 50 percent of players of video-games are spending money monthly on video games.** This was disproven, as 58 percent of all players spend money monthly on video games. This hypothesis was based on the presumption, that people don't waste their money to buy different items in or for video-games. But the data are showing that people spend money to have improvements, bonuses or in-game currencies for the games they play and don't think it is wasted money for the digital content they receive.

When buying new game, 45 percent of people said they are willing to pay more than 30 Euros for a single video-game. Most video-games are expensive on launch, and will fall on

price after some time, generally after a year or two, or after next part of the game will come out. Release prices are almost always over 30 Euros. So 45 percent of gamers from my survey are willing to spend more than 30 Euros to play newly released game and they do not want to wait for the price to drop. Some responders, 16 percent, are not buying any video-games at all, so they are either playing only free-to-play ones or are downloading them illegally. *TrainStation* data is showing that people are willing to spend lot of money to buy in-game currency, as it is generating income more than 1 million Euro each month.

Computer was the sole winner of most used device for playing video-games, as 66 percent of people selected computer as their device for playing. That is not unexpected, as most of the video-games are made for computers. Computers are also much better than consoles, as they have better graphic, computing power, memory and so on. Also, there are programs available, which allow computers to play console discs and so, computer allow also console games to be played through computers. Handheld consoles are almost not used at all, as only 1 percent of responders are using them for their video-gaming. According to ESA, in U.S. more than half of households have also a console for gaming, but gamers prefer computers to play games. It is the same result as in my survey. As *TrainStation* is a browser game, I assume it is mostly played through computer.

People play mostly games through internet, which is why RPGs, strategies and MMOGs got most picked from all genres, with 19, 15 and 13 percent of pick-rate. Least played games are sports and educational games, both with merely 2 percent of pick-rate. For U.S., the most favorite genres in 2014 were action games (28.2 percent), shooters (27.1 percent) and sports (13.3 percent). In my survey, as the most played games were chosen RPGs (19 percent), strategies (15 percent) and MMOGs (13 percent).

The reason why people spend time and money on games and why they play was ‘to have fun’ in 28 percent of cases, followed by ‘because of the story’ of the game in 19 percent picks. Games, mainly on computer and consoles have stories, lore and characters and people like to read the story and play through it. It is similar as with reading fantasy or sci-fi books, but people do not sit and read, they sit and play. The third most chosen choice was ‘to play with friends’ with 17 percent of picks. People like interaction and many times they prefer to play with friends over playing alone. The fourth category with 15 percent of pick-rate was ‘to pass time’. I think this category belongs mostly to tablet and mobile phone games, as people play games on these devices during travels, when they are waiting for something or when they are bored. Only 7 percent of responders are playing games to improve their skills and 3 percent responded with ‘other’ which was not specified further.

The ESA had information only why parents play with their children. The answers which got most percentages were ‘it is fun for the entire family’ with 85 percent, ‘because they’re asked to’ with 75 percent, ‘It is a good opportunity to socialize with their child’ with 75 percent and that ‘they enjoy playing video games as much as their child does’ with 54 percent. The most chosen one, because ‘it is fun’ was also the most picked reason in my survey. So, most people like to play video-games because they are fun.

There are big differences in U.S. ESA study and my survey made here, in Slovakia. That can be because of many reasons, like cultural differences, how people spend free time, amount of people which are using modern technologies, country development and many others. Video-games started around year 1952 in U.S. and later spread to the world. In Slovakia, video-games, consoles and handhelds were not accessible before 1989, because of communism and when communism fell, the video-game industry started to slowly enter Eastern Europe, while in the rest of the world, video-games were already a common thing in households. That may be the reason in the differences between U.S. study and my survey. To make more detailed, accurate and exact study, it is needed to have bigger sample and also to reach all possible age groups, income range groups and degree groups. [64]

[64] Entertainment Software Association. 2015. *The 2015 Essential Facts About the Computer and Video Game Industry.* Retrieved on April 2016 from http://www.theesa.com/about-esa/esa-annual-report/

# CONCLUSION

With the rise of technologies and their improvement, also video-games are expanding. Smartphones, tablets, new generations of consoles and still improving graphics and processors for computers are driving this industry forward. Video-game industry is already a billion dollar industry with three main segments; computers, consoles and mobile phone segments. Total video-game market forecast for year 2015 was more than 111 057 million dollars.

The results of the data analysis from survey and *TrainStation* games showed, that many young people play video-games on daily basis and are willing to pay for games, just to have options to be better than other players. Most people that play are young people, but the data is showing that also some percentage of older people is willing to play games.

Degree does not have an impact on who is playing games, because people of all degrees are playing video-games. The same goes for gender, as the distribution of males and females players is almost the same. For salaries, as people of all different income groups tend to play, I assume that the more money people earn, the more are they willing to spend on video-games.

Interesting is that even the most casual gamers play at least an hour a day and what is alarming is, that 15 percent of gamers play for more than 4 hours each day. That is quite a lot of wasted time. Most people, almost 70 percent of gamers, are not spending money monthly, or spend less than 5 Euro for video-games each month. But still, 77 percent of them are willing to spend more than 10 Euro if some interesting video-game is released.

Computer as device for playing was the best choice and was selected the most. It is not unexpected, as computers are universal tools and with specific software, they can imitate consoles, hand-held consoles or other devices. They also offer better specifications for gaming than mobiles, tablets or consoles. The most played genres of games are Role-Playing Games and Strategy games, but people in U.S. prefer casual and social games.

Most of the questioned people and also people from the ESA survey play video-games because ‘It is fun’. People’s minds and behavior toward video-gaming is slowly changing and so more and more people prefer video-games over books, television or other free-time activity.

Before analyzing and comparing the data from survey, video-gaming company and U.S. ESA, I stated five hypotheses, which I wanted to test. All of my hypotheses were proved wrong by the data and analysis I made. Only one hypothesis, number four, was not

far from reality. It is surprising that all hypotheses were wrong, because they were based on general presumptions about people playing video-games.

Video-game industry is an interesting, fast improving and growing industry, which is young, not well discovered and has unlimited potential and impact for the future.

# RESUMÉ

Ako tému mojej diplomovej práce som si vybral globálny video herný priemysel, jeho vplyv na svetovú ekonomiku a možný budúci vývoj. V dnešnej dobe globalizácie a vo svete pripojeného cez internet, sú video hry jedným z dobre známych foriem zábavy. Termín videohry je spojený s hraním hier na počítačoch, konzolách, mobilných telefónoch a tiež na tabletoch.

Pre pochopenie fungovania a rozvoja v rámci video herného priemyslu, je nutné spoznať jeho históriu. Ako celé odvetvie začínalo, ktorí ľudia mali významný vplyv na formovanie tohto priemyslu, ktoré hry vyústili do revolúcie a aké boli dôvody ku globálnej expanzii.

Video herný priemysel je mladý priemysel, keďže prvá hra je datovaná do roku 1958. Až neskôr sa začal postupne stávať viac populárnym. Výrazný nárast v dostupnosti a popularity prišiel s prvými počítačmi a konzolami v 70tych a 80tych rokoch 20. storočia, ale skutočný boom prišiel až s globalizáciou a internetom v 90tych rokoch. Dá sa povedať, že video herný priemysel nie je viac ako 40 rokov starý. Ešte stále sa vyvíja, rastie a vstupuje do životov bežných ľudí.

Teoretická časť sa venuje komplexnosti video herného priemyslu, porovnaniu najväčších video herných firiem a identifikácii najpredávanejších hier a ich zisku. K dispozícii je aj obchodný model video herného priemyslu a jeho zmeny v posledných rokoch. V závere teoretickej časti je zhrnutie celého trhu a možný budúci vývoj.

Cieľom mojej praktickej časti bolo zhromaždiť reálne dáta poskytnuté video hernou spoločnosťou a vytvoriť dotazník o videohrách a o herných návykov bežných ľudí. Zhromaždené údaje zo spoločnosti a z dotazníka boli spracované a porovnané aj s dotazníkom o videohrách a herných návykoch v Spojených Štátoch, vytvoreným americkou Entertainment Software Association („ESA“).

Moje dáta boli poskytnuté spoločnosťou PIXEL FEDERATION o ich hre *TrainStation*. *TrainStation* je prehliadačová hra hrateľná len prostredníctvom Facebook-u či Google+. Hra je úspešná, pretože má tisíce hráčov on-line každý deň a generuje príjmy, ktoré pochádzajú z nákupov priamo v hre.

Rozoslaný dotazník tvorilo desať otázok. Analýza prvej otázky ukázala, že prednostne mladí ľudia hrajú hry. Zo všetkých odpovedí bolo 83 percent ľudí vo veku od 21 rokov do 30 rokov. Môže byť niekoľko dôvodov prečo tento dotazník vyplnil veľký počet mladých ľudí, napríklad preto, že som ho šíril prostredníctvom sociálnych sietí a tak nedosiahol

staršie vekové skupiny. V porovnaní s dotazníkom americkej ESA, sa výsledky získané v mojom dotazníku líšili. Priemerné vekové kategórie boli odlišné; priemerný hráč v USA má 35 rokov, zatiaľ čo môj prieskum ukazuje priemerný vek okolo 23 rokov. Údaje ESA tiež ukazujú, že 27 percent amerických hráčov má viac ako 50 rokov, zatiaľ čo podľa môjho prieskumu nemal žiadny hráč nad 40 rokov. **Moja prvá hypotéza bola, že viac ako 50 percent hráčov videohier je mladších ako 20 rokov.** Toto nie je pravda pre výsledky z môjho dotazníka, pretože iba 6 percent hráčov je mladších ako 20 rokov. Hypotéza bola založená na predpoklade, že hlavne deti a mladí ľudia sa hrajú videohry a čím sú starší, tým majú viac povinností, prácu, rodinu a už nemajú toľko času na videohry, prípadne vyrástli a hranie hier už pre nich nie je atraktívne.

Rozbor druhej otázky ukázal, že 32 percent hráčov má strednú školu s maturitou a 31 percent z hráčov má bakalársky titul. 34 percent hráčov má magisterský titul a len 1 percento nemal žiadny titul.

Pokiaľ ide o rozdiely medzi pohlaviami, tam nebol takmer žiadny rozdiel medzi USA a výsledkami v mojom dotazníku. V Spojených Štátoch sú 56 percent hráčov muži a 44 percent ženy, kým v mojich výsledkoch je 52 percent sú mužov a 48 percent žien. Percentuálny rozdiel medzi týmito dvoma štúdiami je iba 4 percentá. Inak je tomu s percentom zastúpenia mužov a žien v hre *TrainStation,* kde je počet mužských hráčov štvornásobne vyšší ako počet žien. Pravdepodobne je tento rozdiel spôsobený témou hry a preto hra nie je príťažlivá pre hráčky tak, ako je tomu u hráčov. **Moja druhá hypotéza tvrdila, že viac ako 75 percent hráčov videohier sú muži.** Táto hypotéza bola vyvrátená, keďže pomer mužských a ženských hráčov bol takmer rovnaký, 52 ku 48 percentám. Táto hypotéza bola založená na predpoklade, že u chlapcov a mužov je väčšia pravdepodobnosť že budú hrať videohry než ženy. Aj americký prieskum vyvrátil túto hypotézu. Americká štúdia bola robená na väčšej populačnej vzorke ako môj dotazník, ale ich výsledky sú takmer totožné s mojimi. Jediný výsledok ktorý podporuje túto hypotézu je hra *TrainStation*, kde 81 percent hráčov sú muži. To znamená, že moja hypotéza platí pre hry, ktoré sú špecificky určené hráčom mužského pohlavia.

35 percent respondentov v mojom prieskume zarába viac, než je priemerný slovenský plat, ktorý bol 862 Euro za mesiac v hrubom pre rok 2014. 22 percent opýtaných hráčov zarába od 500 do 1000 Eur v hrubom, takže sa pohybujú okolo priemernej slovenskej mzdy. Iba 12 percent hráčov uviedlo, že nemajú žiadny druh príjmu, 35 percent hráčov zarába viac ako 1000 Eur v hrubom a dokonca päť percent z nich zarába viac ako 2000 Euro v hrubom mesačne. **Moja tretia hypotéza predpokladala, že viac ako 75 percent**

**hráčov videohier zarába menej ako 1000 Euro v hrubom.** Hypotéza bola nesprávna, pretože iba 53 percent hráčov zarába menej ako 1000 Euro v hrubom. Táto hypotéza bola založená na prvej hypotéze ktorá predpokladala, že viac ako 50 percent hráčov je mladších ako 20 rokov. Takí ľudia sú študenti, prípadne iba nedávno začali pracovať a preto nebolo očakávané, že zarábajú viac ako 1000 Euro v hrubom. Tak ako moja prvá hypotéza bola vyvrátená, tak aj táto tretia je vyvrátená, keďže iba 47 percent hráčov zarába menej ako 1000 Euro v hrubom.

Viac ako tretina hráčov z môjho prieskumu, 35 percent, sa hrá menej ako 1 hodinu denne a 42 percent sa hrá od 1 do 3 hodín každý deň. Alarmujúcich je 15 percent respondentov, ktorí sa hrajú viac ako 4 hodiny denne. ESA uvádza, že 42 percent Američanov sa hrá aspoň 3 hodiny týždenne, v porovnaní s 35 percent respondentov z môjho dotazníka, ktorí hrajú 7 a menej hodín týždenne. **Moja štvrtá hypotéza predpokladala, že viac ako 50 percent hráčov videohier sa hrá viac ako 2 hodiny denne.** Tento predpoklad bol nesprávny, keďže iba 43 percent hráčov sa hrá viac ako dve hodiny denne, no táto hypotéza nebola ďaleko od reality. Bola založená na fakte, že hráči venujú väčšinu svojho voľného času na videohry. Tieto výsledky môžu byť skreslené; ľudia môžu klamať o tom, koľko času mrhajú a trávia hraním videohier alebo strácajú pojem o čase počas hrania a tým pádom si neuvedomujú ako dlho strávili hraním. Vďaka analýze dát z *TrainStation* je zrejmé, že väčšina ľudí má tendenciu sa hrať najmä cez víkendy, kedy majú čas. Všeobecne sa hráči hrajú oveľa menej v priebehu pracovného týždňa, než je tomu cez víkend.

Ďalej bolo analyzované, koľko peňazí respondenti mesačne míňajú na hry. 42 percent respondentov uviedlo, že mesačne nemíňajú peniaze vôbec. 25 percent uviedlo, že minú menej ako 5 Euro každý mesiac na videohry. To môže byť nákup hier keď sú v zľave, alebo sú to peniaze použité na mesačný poplatok, ktorý treba platiť, aby daný hráč mohol hrať hru. Napriek tomu štyri percentá respondentov napísali, že míňajú viac než 20 eur každý mesiac na videohry. **Piata hypotéza predpokladala, že menej ako 50 percent hráčov videohier míňa na ne peniaze mesačne.** Hypotéza bola vyvrátená, pretože 58 percent hráčov míňa peniaze na videohry každý mesiac. Hypotéza bola založená na predpoklade, že ľudia nebudú míňať svoje peniaze, aby si zakúpili rôzne veci v alebo pre videohry. No dáta ukazujú, že ľudia míňajú peniaze, aby mali rôzne vylepšenia, bonusy alebo hernú menu v hrách ktoré hrávajú a nemyslia si, že sú to vyhodené peniaze za digitálny obsah, ktorý dostanú.

Pri nákupe novej hry, 45 percent ľudí uviedlo, že sú ochotní zaplatiť viac ako 30 eur za jednu videohru. Väčšina video hier je drahých po vydaní a cena klesne po určitej dobe, zvyčajne po roku či dvoch, alebo po vydaní pokračovania. Ceny pri vydaní sú takmer vždy viac ako 30 eur. 45 percent hráčov z môjho prieskumu sú ochotní minúť viac ako 30 eur aby mohli hrať novo vydanú hru a nechcú čakať, kým cena klesne. Niektorí respondenti, 16 percent, si nekupujú video hry vôbec, takže buď hrávajú iba tie, za ktoré sa nemusí platiť alebo si ich stiahnu nelegálne. Dáta z hry *TrainStation* ukazujú, že ľudia sú ochotní minúť veľa peňazí na nákup špeciálnej meny ktorá je použitá v hre, pretože *TrainStation* generuje príjmy viac ako 1 milión EUR mesačne.

Počítač bol jednoznačný víťaz ako najpoužívanejšie zariadenie pre hranie video hier, keďže 66 percent ľudí si zvolilo v dotazníku počítač ako ich najpoužívanejšie zariadenie na hranie hier. Nie je to neočakávané, pretože väčšina video hier je robená pre počítače. Počítače sú tiež oveľa lepšie ako konzoly, pretože majú lepšiu grafiku, výpočtový výkon či pamäť. Tiež sú na počítače dostupné programy, ktoré umožňujú počítačom prehrávať hry pre konzoly a tak počítač umožňuje tiež hranie konzolových hier. Konzoly do ruky sa takmer nepoužívajú vôbec, pretože len 1 percento respondentov ich používa ako svoj hlavný nástroj pre hranie video hier. Podľa ESA má v USA, viac ako polovica domácností konzolu pre hranie hier, ale napriek tomu hráči radšej uprednostňujú počítač. Keďže *TrainStation* je hra cez prehliadač, predpokladám, že väčšinou sa hrá cez počítač.

Väčšina hier sa hrá cez internet, čo je dôvod, prečo RPG hry a stratégie boli najviac vybrané zo všetkých žánrov, s 19 a 15 percentami. Najmenej hrané hry sú športové a vzdelávacie hry, obe iba s 2 percentami. Najviac obľúbené žánre v roku 2014 v USA, boli akčné hry (28,2 percenta), strielačky (27,1 percenta) a športové hry (13,3 percenta).

Najčastejším dôvodom, prečo ľudia trávia čas hrami, míňajú na ne peniaze a prečo sa vlastne hrajú bol "kvôli zábave" v 28 percentách prípadov, nasledovaný "z dôvodu príbehu" hry v 19 percent voľby. Hry, najmä na počítačoch a konzolách, majú príbehy, históriu a charaktery a ľudia radi čítajú tento príbeh a hrajú ho. Je to podobné ako u čítanie fantasy alebo sci-fi kníh, ale ľudia namiesto čítania hrajú hru. Tretím dôvodom prečo ľudia trávia svoj voľný čas hraním video hier bolo, pretože sa môžu "hrať s priateľmi". Túto možnosť označilo 17 percent respondentov. Ľudia majú radi interakciu a mnohokrát dávajú prednosť hrám s priateľmi ako keby sa mali hrať sami. Štvrtá kategória s 15 percentami voľby bolo aby "zabili čas". Myslím, že táto kategória patrí najmä k tabletom a mobilným telefónom, pretože ľudia hrajú hry na týchto zariadeniach na cestách, keď sa na niečo

čakajú, alebo keď sa nudia. Iba 7 percent respondentov sa hrá hry s cieľom zlepšiť ich jazykové schopnosti a tri percentá vybralo ako dôvod "ostatné".

Americká ESA mala len informácie prečo sa rodičia hrajú video hry so svojimi deťmi. Odpovede ktoré dostali najviac percent v ich prieskume boli "je to zábava pre celú rodinu" , "pretože ich o to požiadali", pretože "je to dobrá príležitosť socializovať sa s dieťaťom" a že "si užívajú hranie videohier, rovnako ako ich dieťa". Najviac zvolená odpoveď "je to zábava" bola tiež najviac vyberanou voľbou v mojom dotazníku. Väčšina ľudí sa hrá video hry, pretože ich to baví.

Existujú veľké rozdiely v americkej štúdii od ESA a môjho dotazníku. Dôvodov na tieto rozdiely môže byť mnoho, napríklad kultúrne rozdiely, ako ľudia trávia voľný čas, množstvo ľudí, ktorí využívajú moderné technológie a vývoj krajiny. Video hry začali okolo roku 1952 v USA a neskôr sa rozšírili do celého sveta. Na Slovensku video hry, konzoly a konzoly do ruky neboli dostupné pred rokom 1989, kvôli komunizmu a keď komunizmus padol, video herný priemysel začal pomaly vstupovať aj do Východnej Európy. Vo zvyšku sveta boli už video hry v domácnostiach bežná vec. To môže byť dôvod, prečo je toľko rozdielov medzi prieskumom robeným v USA a mojím dotazníkom. Pre podrobnejšie, presnejšie a exaktné štúdie je potrebné mať väčšiu vzorku. Tak isto je potrebné zahrnúť všetky možné vekové skupiny, príjmy a dosiahnuté vzdelanie.

S vzostupom technológií a nepretržitým vývojom sa rozširujú aj video hry. Inteligentné telefóny, tablety, nové generácie konzol a stále sa zlepšujúce grafiky či procesory pre počítače poháňajú toto odvetvie vpred. Video herný priemysel je už priemysel kde zisky idú do miliárd dolárov. Má tri hlavné segmenty; počítače, konzoly a mobilných telefónov s tabletmi. Prognóza zisku trhu video hier pre rok 2015 bola viac ako 111 057 miliónov dolárov.

Výstupom mojej diplomovej práce boli nasledujúce výsledky. Analýza dát z dotazníka a z hry *TrainStation* ukázala, že mnohí mladí ľudia sa hrajú videohry dennodenne a sú ochotní platiť za ne. Dosiahnuté vzdelanie, pohlavie a výška príjmu nemajú vplyv na skutočnosť, že sa ľudia hrajú videohry alebo koľko času sa hrajú.

Veľa hráčov trávi niekoľko hodín denne hraním svojich obľúbených videohier. Napriek tomu ľudia nezvyknú utrácať peniaze za videohry mesačne, skôr preferujú si hru stiahnuť, alebo hrajú hry za ktoré netreba platiť. Na druhú stranu ak sa objaví zaujímavý titul alebo dlho očakávaná hra, sú za ňu ochotní minúť desiatky eur. Napriek vzostupu inteligentných telefónov a tabletov, sú počítače stále tou najlepšou voľbou pre hranie videohier.

Ľudia sa radi hrajú nenáročné a spoločenské videohry, ale väčšina hráčov dáva prednosť hrám, v ktorých sa vžijú do hrdinov alebo strategickým hrám. Video herné žánre idú ruka v ruke s dôvodmi, prečo ľudia hrajú videohry. Väčšina hráčov sa hrá, pretože "je to zábava" a tiež "kvôli príbehu" vo videohrách.

Pred analýzou a porovnaním dát z dotazníka, od video hernej spoločnosti a americkej ESA, som si určil päť hypotéz, ktoré som chcel otestovať. Všetky moje hypotézy boli preukázané ako nepravdivé dátami a analýzou ktorú som spravil. Iba jedna hypotéza, číslo štyri, nebola ďaleko od skutočnosti. Je prekvapujúce, že všetky hypotézy sa ukázali ako nepravdivé, pretože boli založené na všeobecných domnienkach o ľuďoch, ktorí sa hrávajú videohry.

Videohry vstupujú do domácností a stávajú sa niečím, čo väčšina ľudí robí denne aby im ubehol čas, alebo ako odpočinok po ťažkom dni v práci. Ľudia pomaly začínajú preferovať videohry nad televíziou, knihami alebo inými voľno časovými aktivitami. To je výhodné pre video herný priemysel, pretože to je zaujímavé, rýchlo sa vylepšujúce a rastúce odvetvie, ktoré je síce mladé a nie je dobre preskúmané, ale má neobmedzený potenciál a dopad na budúcnosť.

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# APPENDICES

## APPENDIX 1 - FIGURES

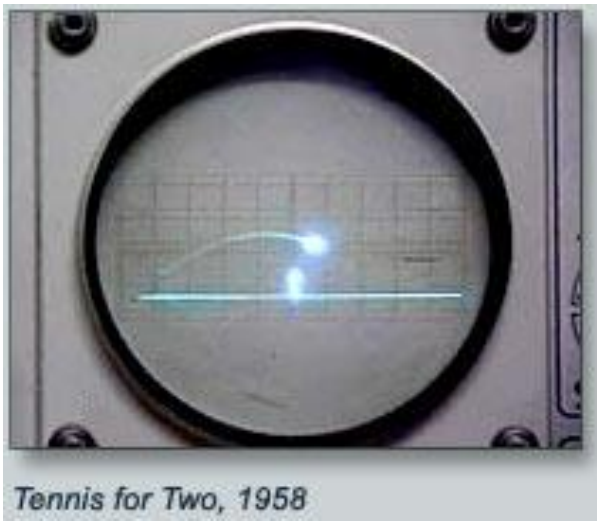


Figure 1: *The Tennis for Two*

*Source: http://www.stonybrook.edu/commcms/libspecial/videogames/whbio.html*


Figure 2: *Spacewar*

*Source: http://arstechnica.com/gaming/2011/10/spacewar-the-first-2d-top-down-shooter-turns-50/*

Figure 3: *Magnavox Odyssey*

*Source: http://www.computinghistory.org.uk/det/16909/Magnavox-Odyssey/*

Figure 4: *Computer Space machine*

*Source: http://www.technologizer.com/2011/12/11/computer-space-and-the-dawn-of-the-arcade-video-game/*


Figure 5: *Pong*

*Source: http://pongmuseum.com/faq/*


Figure 6: *Atari 2600*

*Source: http://www.8-bitcentral.com/atari/2600.html*


Figure 7: *Radarscope with Donkey Kong*

*Source: http://www.warpedfactor.com/2015/03/10-things-you-might-not-know-about_18.html*


Figure 8: *Nintendo Wii*

*Source: http://www.engadget.com/products/nintendo/wii/console/*


Figure 9: *Sega Master System*

*Source: http://www.old-computers.com/museum/computer.asp?st=2&c=840*


Figure 10: *Sega Genesis*

*Source: http://nintendoenthusiast.com/news/sega-genesis-got-power-boost-right-release-compete-snes/*

Figure 11: *Sega Dreamcast*

*Source: http://segaretro.org/Sega_Dreamcast*


Figure 12: *Sony PlayStation*

*Source: https://www.playstation.com/en-us/corporate/about/theplaystationstory/*

Figure 13: *Sony PlayStation 2*

*Source: https://www.playstation.com/en-us/corporate/about/theplaystationstory/*


Figure 14: *PSP*

*Source: https://www.playstation.com/en-us/corporate/about/theplaystationstory/*


Figure 15: *XBox*

*Source: http://www.digitaltrends.com/gaming/the-history-of-the-xbox/*

Figure 16: *XBox 360*

*Source: http://www.digitaltrends.com/gaming/the-history-of-the-xbox/*


Figure 17: *Concurent Steam Users*

*Source: http://store.steampowered.com/stats/* (5 December, 2015 @ 4:47pm)

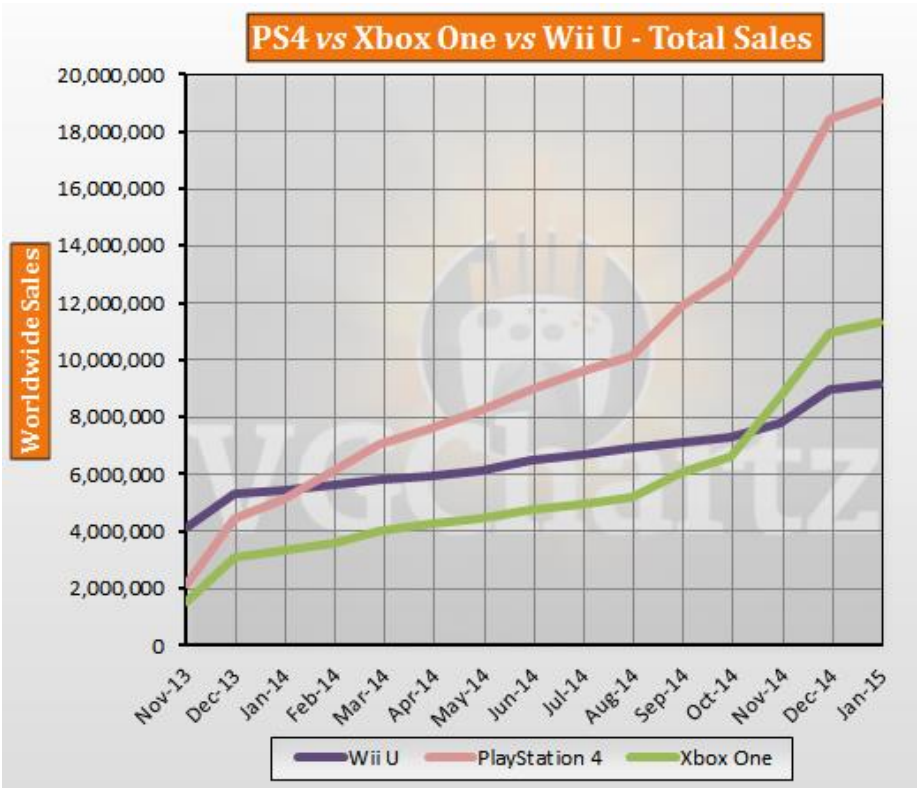


Figure 18: *Console Total Sales*

*Source: http://www.vgchartz.com/article/253113/ps4-vs-xbox-one-vs-wii-u-lifetime-salesjanuary-2015-updateps4-1905m-xbox-one-113m-wii-u-914m/*

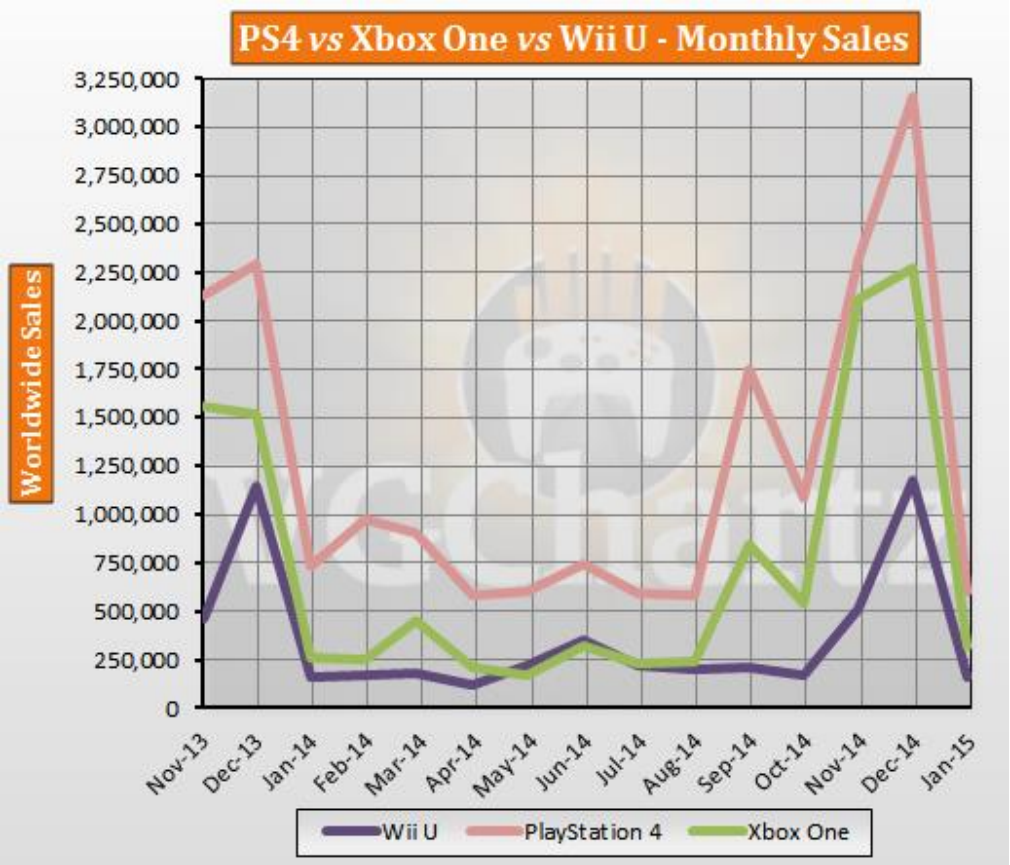


Figure 19: *Monthly Console Sales*

*Source: http://www.vgchartz.com/article/253113/ps4-vs-xbox-one-vs-wii-u-lifetime-salesjanuary-2015-updateps4-1905m-xbox-one-113m-wii-u-914m/*

Figure 20: *Steam Box with Controller*

*Source: http://blogs-images.forbes.com/jasonevangelho/files/2015/02/gspyvk6puhn4ibeozkft.jpg*


Figure 21: *TrainStation game*

*Source: http://portal.pixelfederation.com/en/trainstation/?game_lang=EN*


Figure 22: *"Gems" bundles in TrainStation game*

*Source: http://portal.pixelfederation.com/en/trainstation/?game_lang=EN*

# APPENDIX 2 – VIDEO-GAME SURVEY

### 1.1. Question 1: Your Age?

1) 0-15
2) 16 - 20
3) 21 - 25
4) 26 - 30
5) 31 - 35
6) 35 – 40
7) 40+

### 1.2. Question 2: Your Degree?

1) No Degree
2) Middle School With Graduation
3) Associate Degree
4) Bachelor's Degree
5) Master's Degree
6) Doctoral Degree

### 1.3. Question 3: Your Gender?

1) Male
2) Female

### 1.4. Question 4: Your Income Range? (Gross Salary)

1) No income
2) 0 - 500 Euro
3) 500 - 1000 Euro
4) 1000 - 1500 Euro
5) 1500 - 2000 Euro
6) 2000 and More Euro

### 1.5. Question 5: How Many Hours per Day You Play Video-games? (on phone, tablet, console, computer, etc.)

1) I do not play video-games
2) Less than 1 Hour

3) Between 1 and 2 Hours

4) Between 2 and 3 Hours

5) Between 3 and 4 Hours

6) More than 4 Hours

### 1.6. Question 6: How Much Money You Spend Monthly on Video-games?

1) I do not spend money on video-games

2) Less than 5 Euro

3) Between 5 to 10 Euro

4) Between 10 to 15 Euro

5) Between 15 to 20 Euro

6) More than 20 Euro

### 1.7. Question 7: What is the Maximum Money you Would Spend for a Video-game?

1) I do not buy video-games

2) Less than 5 Euro

3) Between 5 to 10 Euro

4) Between 10 and 20 Euro

5) Between 20 and 30 Euro

6) Between 30 and 50 Euro

7) More than 50 Euro

### 1.8. Question 8: What is the Device You Use Most to Play Video-games?

1) I do not play video-games

2) Phone

3) Tablet

4) Handheld Consoles (GameBoy, Nintendo 3DS, PSP, PlayStation Vita)

5) Console (XBox, PlayStation, Wii)

6) Computer

### 1.9. Question 9: What Kind of Genre You Play?

1) Action

2) Adventure

3) RPG (Role Playing Game)

4) Simulation

5) Strategy

6) Sports

7) MMOG (Massively Multiplayer Online Game)

8) Logic

9) Educational

10) Casual (Candy Crush, Farmville, browser games, etc.)

### 1.10. Question 10: If You Play Games, Why?

1) I do not play video-games

2) To pass time

3) Because of the story

4) To have fun

5) To play with my friends

6) To improve my language skills

7) For the action

8) Other