

Money in the Pixels

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Abstract—Video games sales are increasing day by day and regarding the last decade it became a huge industry. The impact of the video games on human life has various fields such as psychology, demand on technological development of hardware components, the way that people earn money, improving human skills and much more. Number of the game production is very high nowadays, this research will clarify the year by year increase to show it is related with technological developments and how what kind of effects occur because of the generally preferred game genres.

Keywords—Video Games, psychology, technology, game industry.

1. INTRODUCTION

The “stress” is an unavoidable term nowadays, because of politics, responsibilities, having no friends, schools, family issues and there exists much more. Regarding last decade people became more stressful and to decrease their stress level they want to use their leisure time activities efficiently which are one of the most important part of human lives because these activities decreases stress level of people who has a intensive work shifts or school assignments etc. People's need for entertainment sharply rises with the development of technology in every part of life such as public transportation, workplaces, parks, cafes, and in their homes. To decrease the stress of daily challenges, people use their smartphones, tablets, PCs, and game consoles for playing video games as a leisure time activity.

Growth of the game industry became unavoidable and there exist several reasons such as demand on technological devices, advertisements became more widespread, the new job opportunities “E-Sports”, and the developers also trying to people to engage with each other in the game environment which is cross-platform games. In 2020 with the help of the COVID-19 pandemic just mobile game industry has a 10.1 billion USD market share only in North America [1]. Besides, the total value of the video game industry in the U.S is 60.4 billion USD [1]. With the considerable increase in technology manufacturing processes, the GPUs are so much more powerful and highly capable than before. Therefore, games are developed according to these improvements and now they require much more GPU power to run them in ultra-graphic settings. Powerful GPUs also enable you to play VR games with very realistic graphics today and have a chance to live through the game. With very good-looking AAA quality games people are more interested in video games. For instance, more than 150 million people in the United States play video games regularly, or for at least 3 hours per week [2]. The average American gamer is a 35-year-old adult, with 72 percent of gamers aged 18 or older [2]. Also, the technology market is aware of this, and tech companies consistently produce much more gaming products like high resolution and high refresh rate monitors, RGB keyboards,

mouses, headphones, or even chairs. In this kind of situation, games are sold more and the industry is expanding in direct proportion. In this research, we will deeply examine how the game industry sales change regarding regions, platforms, and genres of the games and what kind of effects on people's psychologies.

2. STUDY AREA AND DATA METHODOLOGY

In this project, a dataset that will be used for creating statistical data, derived data, plotting, and visualization is “Video Game Sales”. This dataset provides useful columns to analyze video game sales in the industry. Columns include Name of game, launch year, the genre of the game, the platform of the game (PS, Xbox, PC, Mobile, Nintendo, etc.), and sales in different regions which enable us to derive new data or some statistics [3]. For instance, regional sales can be compared based on the type of game. This comparison will give us specific information like which region plays action games more.

Multiplayer gamers engage with each other in the virtual world rather than real life and its effect on the game industry and gamers psychology. Regarding our social lives, people became more connected even if they are staying at their homes with the help of a multiplayer game environment. Since, before the multiplayer games, people meet with their friends, join activities, etc. or their job environment to improve their social connections whereas nowadays people can stay connected while staying in their homes.

Cross-platform gaming which enables people to play at the same time even if the platform is different. For example, “Fortnite” is a multiplayer game that can be played on Xbox and PS so the companies worked on that they can engage their players in the same environment which increases the number of people interacting in the game.

3. RESULTS AND DISCUSSION

The increase in the Game Industry increased the demand of people who are developing games and various new job opportunities such as (Streaming games on different platforms eg:” Twitch”). These factors affected the people to buy and demand new games more and more. Which is a process that shows rising numbers of gaming market sales. New technologies such as better quality of game consoles, the closer perspective of the real world regarding the graphics of the games, better internet connection have a big role in the game industry. So, the development of a game has also changed by hiring experts (“psychologists, game developers, advertisers, streamers) and also the data which has been collected regarding previous human approaches to different game genres and platforms. Also, the impacts of game genres and the advertisements are negotiated with the psychologists to increase the number of demands on the game market.

3.1 NUMBER OF PRODUCTIONS IN GAME INDUSTRY

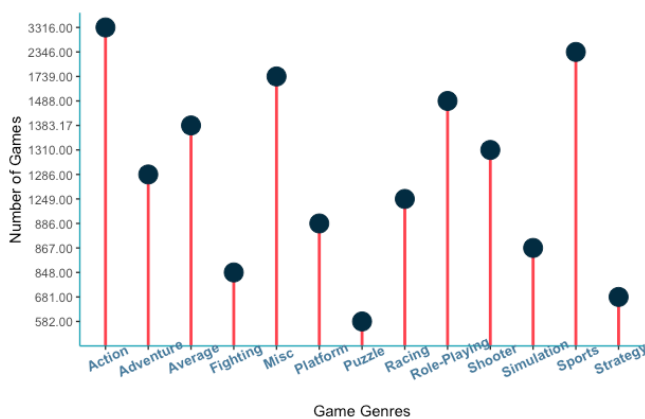


Figure 1. Number of games produced for each game genres on the market

In the Figure 1 as you can see action games are the most produced game genre and the next two genres are Sports and Miscellaneous games are produced. Action games contain many challenges that are essentially a mix of turn-around fighting, puzzle-solving, etc. Some focus more on storytelling or multiplayer options, but a variety of activities such as jumping, chasing, fighting, solving. Perhaps the most appealing thing about action games is that they are intuitive to get into but have a difficulty curve that increases with time. The best action games find the perfect blend of everything this genre has to offer and channel it into a unique experience that only an action game can offer.

First-person shooter games, in which players shoot enemies in a virtual battlefield through a first-person perspective, is a major genre in the world of video games across various gaming platforms, with numerous hit titles such as Doom, Quake, Counter-Strike, and Halo. Most of these games support online multiplayer experience, bringing millions of players together [4]. So the number of people engaging each other multiply itself by multiplayer gaming which is also supported by cross-platforms to increase the player number.

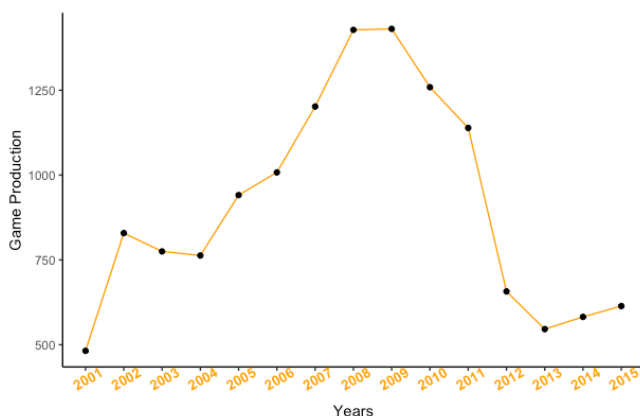


Figure 2. Regarding Year by year the increase in the Video Game Production globally

The sharp increase in the game production can be inspected very clearly in this graph. The developing technology increased the game production. Hardware components are increased the production quality of the game industry which increased the demand on game producers, software developers, and much more related job fields. Nowadays games are closer to the real-world regarding graphics and game aesthetics.

As mobile hardware continues to become more powerful, with handsets like the iPhone XS Max leading the charge, developers will have more to work with and thus will be able to rival console games. Streaming software from Microsoft (Project x Cloud), Google (Project Stream) and EA are all being worked on or currently even being tested, which would allow anyone, anywhere to access console-quality titles on any device, even if it doesn't have the specs to run them natively using its built-in hardware [5].

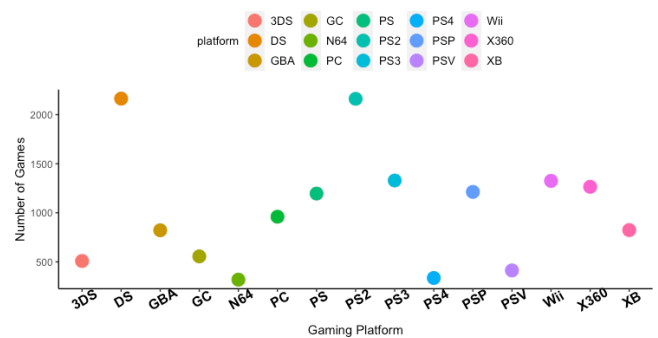


Figure 3. The number of games produced for each platform

The greatest number of games are produced for Nintendo DS. This is because Nintendo DS is the best selling handled game console up to date. The second best selling video game console of all time behind Sony's PlayStation 2 as you can see on the Figure 4.

Having a cross-genre appeal could massively boost a game's chances of being successful across devices. In September 2018, Sony also announced the PlayStation 4 cross-play beta program, which allowed Fortnite users on Xbox One, PS4, Nintendo Switch, Mac, PC and mobile devices to all play together [5].

Games like Fortnite and PlayerUnknown's Battlegrounds (PUBG) have massively benefited from console-quality games emerging on high-end mobile devices. The iOS version of Fortnite, realized in April last year, made an estimate of \$2 million per day [5].

3.2 NORTH AMERICA AND EUROPE SALES

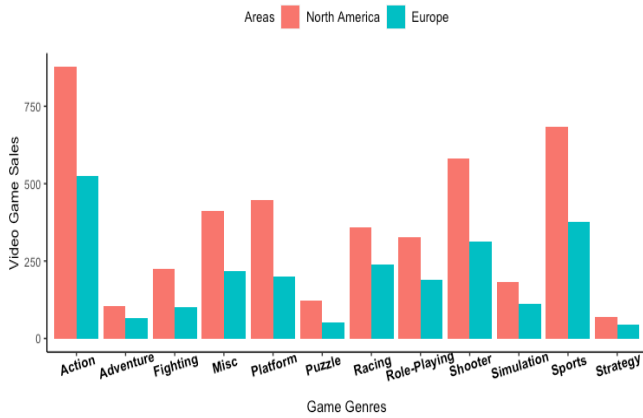


Figure 4. Video games sales regarding regions; North America and Europe

The number of total action game sales are the most preferred game genre considering these regions. However, in North America game sales are higher in every game genres and this is because people became more addicted to playing games in America and people's who live in North America purchasing power is higher considering the hardware components, game consoles and games.

Population thoughts on stress level of people who plays action games must be decreased because they think that playing action games which includes running, jumping and also feelings such as fear etc. can decrease their stress level by shooting enemies. However, the research findings revealed that the salivary α -amylase concentration increased significantly after playing the Fear game, Runner game, and Excitement game and decreased significantly after playing the Puzzle game. Moreover, the concentration of salivary cortisol increased significantly after playing the Runner game, Excitement game, and Fear game and decreased significantly after playing the Puzzle game. The brain wave analysis also revealed that the level of stress experienced by playing Fear game was higher than the Excitement game [6].

3.3 THE STATISTICAL CHARACTERISTICS OF NORTH AMERICA AND EUROPE

The descriptive statistics show that, the total number of games launched between the years 1980 and 2017 is more than 16.000. This number is huge when we consider the development time of modern games in these days. When we look at the tables, action game genre gets the biggest part of the cake. However, the sales are not directly proportional. Statistics shows that, the top seller genre according to the means of sales is platform games. Another remarkable point is the skewness and kurtosis of the data because numbers are huge according to their sales distribution. Some games are sold a much in a specific genre but some games could not sell even 1 copy. So this opposition leads to that kind of skewness and kurtosis in the distribution.

Table 1. Descriptive statistical values and frequency histograms for North America sales of video games by their genres during 1980-2020.

North America Sales	Descriptive Statistics									Frequency Histogram								
Genre	Number of Games	Max	%75	Mean	%25	Min	Std	Skw	Kur	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45
Action	3316.00	9.63	0.26	0.26	0.02	0.00	0.57	7.09	80.40	3310.00	6.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Adventure	1286.00	6.16	0.07	0.08	0.00	0.00	0.27	11.73	209.72	1285.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fighting	848.00	6.75	0.29	0.26	0.00	0.00	0.52	4.87	39.14	847.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Misc	1739.00	14.97	0.21	0.24	0.00	0.00	0.69	12.24	220.08	1734.00	3.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
Platform	886.00	29.08	0.44	0.50	0.05	0.00	1.50	10.86	167.24	875.00	6.00	4.00	0.00	0.00	1.00	0.00	0.00	0.00
Puzzle	582.00	23.20	0.14	0.21	0.01	0.00	1.06	18.31	384.17	580.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
Racing	1249.00	15.85	0.27	0.29	0.03	0.00	0.74	11.00	184.58	1245.00	3.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
Role-Playing	1488.00	11.27	0.16	0.22	0.00	0.00	0.67	7.97	89.29	1480.00	7.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Shooter	1310.00	26.93	0.37	0.44	0.03	0.00	1.20	10.73	191.61	1295.00	14.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
Simulation	867.00	9.07	0.24	0.21	0.00	0.00	0.47	9.52	154.09	866.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sports	2346.00	41.49	0.30	0.29	0.02	0.00	1.04	28.59	1068.23	2342.00	2.00	0.00	1.00	0.00	0.00	0.00	0.00	1.00
Strategy	681.00	3.18	0.08	0.10	0.00	0.00	0.30	5.98	43.26	681.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Average	1383.17	16.46	0.23	0.26	0.01	0.00	0.75	11.57	235.99	1378.33	3.75	0.58	0.17	0.08	0.17	0.00	0.00	0.08

Europe Sales	Descriptive Statistics									Frequency Histogram					
Genre	Number of Games	Max	%75	Mean	%25	Min	Std	Skw	Kur	0-5	5-10	10-15	15-20	20-25	25-30
Action	3316.00	9.27	0.15	0.16	0.00	0.00	0.41	8.52	121.96	3311.00	5.00	0.00	0.00	0.00	0.00
Adventure	1286.00	2.79	0.03	0.05	0.00	0.00	0.18	8.04	85.78	1286.00	0.00	0.00	0.00	0.00	0.00
Fighting	848.00	2.61	0.12	0.12	0.00	0.00	0.25	4.45	26.97	848.00	0.00	0.00	0.00	0.00	0.00
Misc	1739.00	9.26	0.08	0.12	0.00	0.00	0.45	12.20	212.86	1737.00	2.00	0.00	0.00	0.00	0.00
Platform	886.00	9.23	0.19	0.23	0.01	0.00	0.59	7.69	87.96	884.00	2.00	0.00	0.00	0.00	0.00
Puzzle	582.00	5.36	0.05	0.09	0.00	0.00	0.32	10.05	139.17	581.00	1.00	0.00	0.00	0.00	0.00
Racing	1249.00	12.88	0.16	0.19	0.01	0.00	0.58	12.01	212.53	1246.00	2.00	1.00	0.00	0.00	0.00
Role-Playing	1488.00	8.89	0.07	0.13	0.00	0.00	0.49	9.62	121.58	1484.00	4.00	0.00	0.00	0.00	0.00
Shooter	1310.00	5.88	0.23	0.24	0.01	0.00	0.55	5.41	38.67	1307.00	3.00	0.00	0.00	0.00	0.00
Simulation	867.00	11.00	0.07	0.13	0.00	0.00	0.51	13.86	256.97	865.00	1.00	1.00	0.00	0.00	0.00
Sports	2346.00	29.02	0.11	0.16	0.00	0.00	0.78	24.78	839.52	2341.00	3.00	1.00	0.00	0.00	1.00
Strategy	681.00	2.27	0.04	0.07	0.00	0.00	0.19	6.45	52.14	681.00	0.00	0.00	0.00	0.00	0.00
Average	1383.17	9.04	0.10	0.14	0.00	0.00	0.44	10.26	183.01	1380.92	1.92	0.25	0.00	0.00	0.08

Table 2. Descriptive statistical values and frequency histograms for Europe sales of video games by their genres during 1980-2020.

4. CONCLUSION

In a conclusion, while doing our research and getting knowledge about the video game industry and its sales, we realized that the industry rising sharply in the COVID-19 pandemic. Also, the numbers and statistics show that the industry still has the potential for growth in the future. We found that the hugely expanding mobile game industry creates a new huge market for video games and the time that people need to spend on their houses is increasing numbers. Therefore, we can provide a reason to question that asks “why the market still have a growth potential?”. Also, the popular video game sharing platforms in which people are sharing their game people with some people. They are also making huge money from this new job called “streamer”. The streamers share their gameplays via some live platforms such as “Twitch” and also upload the stream replays to their YouTube channels which creates a double-winning situation. Also, the new generation loves watching these people while they are playing games because the children also want to play games like a streamer. However, their families and parents want them to study for their education and don’t buy computers like that has that amount of power. Another reason, in some countries the computer parts or the technology price, is so much that people cannot afford. These are the reasons why this streamer watched that much. While they are getting that amount of views the game industry and also the computer part manufacturers making sponsor agreements with these popular guys. They are getting potential customers via the streamers because the field of interest of the viewers is also the gaming or related fields. The video game industry and the product manufacturers making a good profit with this situation. In the end, the market is getting huge day by day because of the main drives mentioned above. This growth will open a new era in the gaming industry in the future and we will talk about the many times more amount of industry share in the global market.

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