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The video game industry and microtransactions

An analysis on the perceived differences between cosmetic - and pay-to-win microtransactions

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The video game industry and microtransactions

An analysis on the perceived differences

between *cosmetic* - and *pay-to-win* microtransactions

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Haris Djukic
Luxembourg, June 8th 2021

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CHAPTER A) THEORETICAL PART

Introduction

The love of playing is as old as people themselves. For kids, playing is vital to prepare for life, for adults playing is a means to escape reality for a moment and to entertain themselves. Like almost all areas of our modern society, playing has also shifted to the digital world in recent decades. In 2020, a year marked by the COVID-19 pandemic, nearly one third of the world's population regularly spent time playing video games, using a mobile phone, a game console or a computer.[1] From its humble beginnings in the 1950, where researchers at US universities were developing the first prototypes of video games, to becoming a multimillion-dollar industry, video games have experienced a meteoric rise. Nowadays, there are innumerable independent game studios that develop games for all kinds of platforms: Computers, consoles, tablets and mobile phones. As a result, even more people play video games on a regular basis. Moreover, it is no longer just children and young people who play games. Even elderly people are discovering games of skill and patience on their mobile phones, regardless of the environment, in the train while waiting for the bus or before going to bed: In every free minute, a video game is instantly available.

With the rise and omnipresence of video games, another business model has established itself in the video game industry in recent years: Microtransactions. The term "microtransactions'' refers to a business model that allows players to buy virtual goods via micropayments. In other words, they constitute small financial transactions that are made in digital games and apps which were introduced into both free-to-play games and pay-to-play games in 2009 and 2010 in response to declining demand for PC and console games and the financial crisis (Grünblatt, 2013). Now, microtransactions, which can also be called in-game purchases, constitute a multimillion-dollar business model themselves.

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[1] https://www.statista.com/statistics/293304/number-video gamers/#:~:text=Video%20gaming%20is%20a%20hobby,across%20the%20globe%20in%202020., *Number of video gamers worldwide in 2020, by region*, retrieved on November 11, 2020

In this context, microtransactions have become an integral part of the video game industry and are to be found in almost every type of game, no matter the platform. Despite their commercial success, the growth and persistence of microtransactions in video games have spawned many debates on their importance, ethics, and effects (Ball & Fordham, 2018). Even though there some illuminating works which have been done to examine both the technological and economic shifts caused by microtransactions from a historical point of view in the video game industry (Kerr, 2017; Sandqvist, 2015) academic examinations on the impact that microtransactions have on the video game experience and player perceptions are scarce (Švelch, 2017).

Hence, this master thesis will focus on analysing how microtransactions are perceived and try to quantify the impact that microtransactions can have on the video game experience of a player. More specifically, we will try to find out if there is a difference between specific types of microtransactions, namely cosmetic and pay-to-win microtransactions.[2] Although before doing so, we'll first focus on the theoretical part where we'll inter alia pay closer attention to the video game industry and microtransactions.

We'll first take a brief look into the perception of video games in our society and then focus on the size of its industry, thus delivering arguments on why this sector deserves more scholar attention. On top of that, we'll do some exploratory work by developing a Business Model Canvas (BMC) of the video game industry to gain a better insight of its rather under-studied structure. Then, in order to familiarise ourselves more with the term "microtransaction", we'll examine its definition and its different existing types.

Subsequently, we'll also look into the rise of microtransactions and highlight their impact on the industry. These findings will not only help us to understand the problematic of the thesis and lay the basis for the practical part, but also shed more light on a topic that will undoubtedly become even more important in the future.

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[2] These terms will be explained in 2.2.5 Cosmetic and Pay-To-Win - purchases

Then, this thesis will contain a practical segment analysing inter alia the influence the purchase of a specific kind of microtransaction can have on the game experience of a player by using different variables of measurement. We will also elaborate in detail on our methodology.

The results of our research will then be analysed and used to infer the key takeaways and implications for the video game developers. In addition, we'll also emphasize the limitations of our research. Finally, we will draw to a close with a conclusion summarizing the key points and observations throughout the realization of this thesis.

1. The video game industry

1.1 Perception of video games in the academic world

First and foremost, it is important to define the position of video game studies in the academic field. Even though video games are meaningful and not just in a sociological or economic context, but as a cultural expression (Jones, 2008), research and data about this thriving industry still seems to be scarce and not subject to a lot of academic research (Egenfeldt-Nielsen et al., 2019). Especially when compared to the more established entertainment industries like movies and music for instance, limited scholarly research has addressed the processes that create value for companies and consumers in the context of video games (Marchand & Hennig-Thurau, 2013).

This can be due to several reasons, such as the lifetime of the gaming industry and their perception from media and parents for instance. Even though one of the first ever video games *Spacewar!* is stated to have been developed back in the 1960's, the game industry only started to experience commercial popularity from the 1970's on (Kowert & Quandt, 2015), making it a relatively young industry compared to other media driven businesses such as films and TV for instance. The perception of video games in society, especially from parents and media seems to play an important role too. As Olson et al. (2008) stated, parents are often left behind when it comes to video games and their impact on the children. Jenkins (2006) goes in the same direction and affirms that the parental perception of video games and what the research shows is strongly disconnected. This affirmation certainly plays a role in the general standing of video games in our society and we can assume that this dysconnectivity can be observed also in academic and educational fields.

Of course, there has been some research done on video games even back then in the 1970's. Nonetheless, these studies focused less on the video games themselves and were more centralized around the effect of video games on societal issues rather than on their content (Kowert & Quandt, 2015). Especially through the 1990s and 2000s, research on video games primarily focused on the effect videogames could have on violent or addictive behaviours (Kowert & Quandt, 2015).

This fixation on establishing causal links between violent behaviour and video games was observable throughout the years. Here, the media plays a very important role too and every so often tends to portray video games as causal contributors to mass homicide, like in Columbine (1999), or the Sandy Hook massacre (2012) for instance (American Psychological Association, 2020). Although several studies (Ferguson et al., 2015; Markey et al., 2014; Przybylski et al., 2014) concluded that there was no relation between violent games and societal aggression or violence, this negative perception is still present even today and could play a role in the lack of video game studies.[3]

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[3] https://www.studyfinds.org/violent-video-games-mass-shootings/, *Violent video games blamed for mass shootings more often when the shooter is white* 2020, retrieved on November 28, 2020

1.2 Size and magnitude of the industry

In spite of these assumptions, the size, growth and the inherent potential of this industry can however not be ignored and must be analysed in order to comprehend the problem and questions of this thesis.

Figure 1 - Video game market value worldwide from 2012 to 2023

Video game market value worldwide from 2012 to 2023 (in billion U.S. dollars)

Year	Value
2012	70.6
2013	76.5
2014	84.8
2015	93.1
2016	106.5
2017	121.7
2018	138.5
2019	145.7
2020	159.3
2023*	200.8

Source
Newzoo
© Statista 2021

Additional Information:
Worldwide; Newzoo; 2012 to 2020
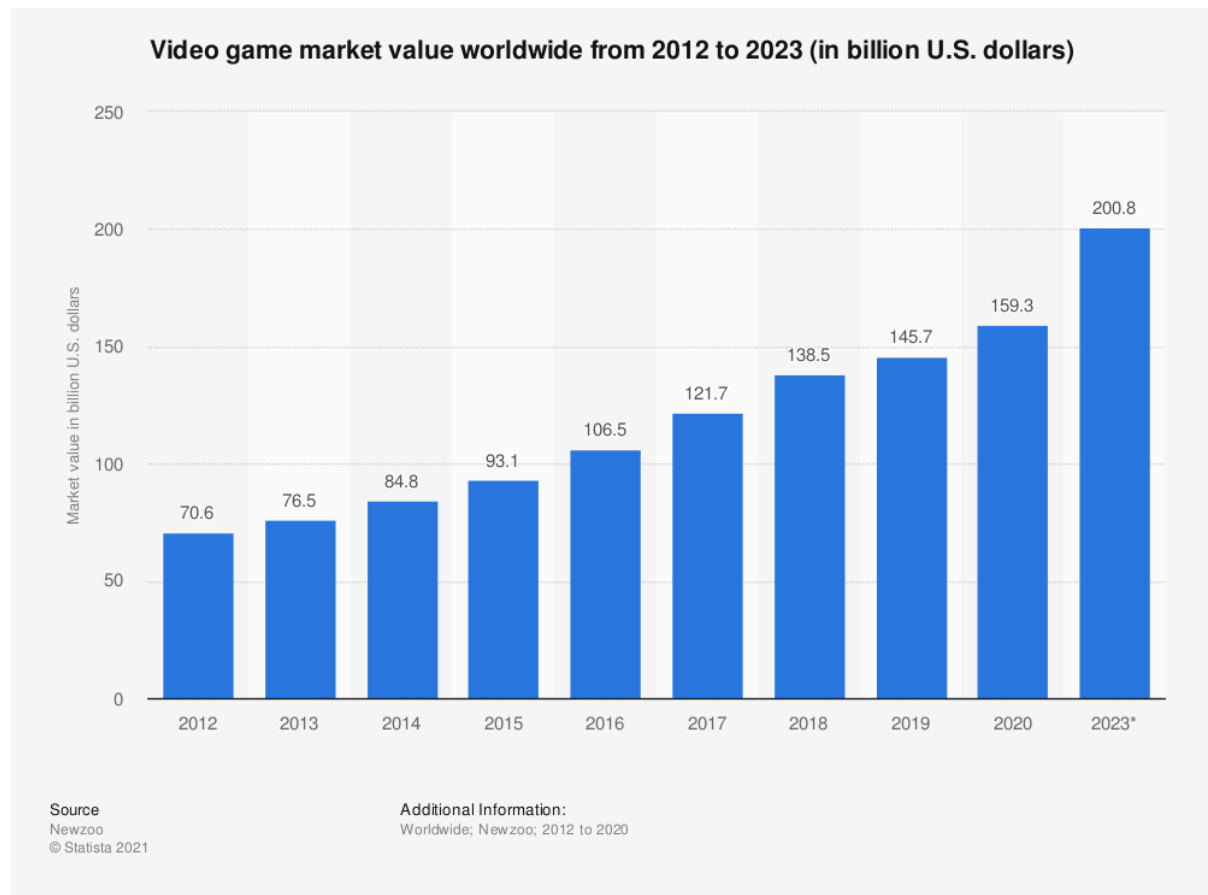
Source: Newzoo, Statista 2021

In fact, according to Newzoo, a data provider for marketing, sales, and product development focusing on gaming, the video game market value in 2020 amounted to 159.3 billion U.S. dollars. This represents a growth of 125.64% compared to 2012 (70.6bn U.S. dollars) meaning that the value of this market has more than doubled in just 8 years. Furthermore, this market is estimated to increase to around 200.8 billion U.S. dollars for the next 3 years (estimated increase of 26.05% from 2020 to 2023). Other market researchers and consulting companies are adopting the same assumptions and unanimously predict strong growth for this industry.

A market analysis report published by Grand View Research for example, approximates an annual compound growth rate (CAGR) of 12.9% from 2020 to 2027 for this industry and Research and Markets reckons a CAGR of 9.24% from 2021 to 2026.[4&5] Naturally, this increase of value goes hand in hand with the growing popularity of video games and number of players worldwide.

Figure 2 - Number of active video gamers worldwide from 2015 to 2023
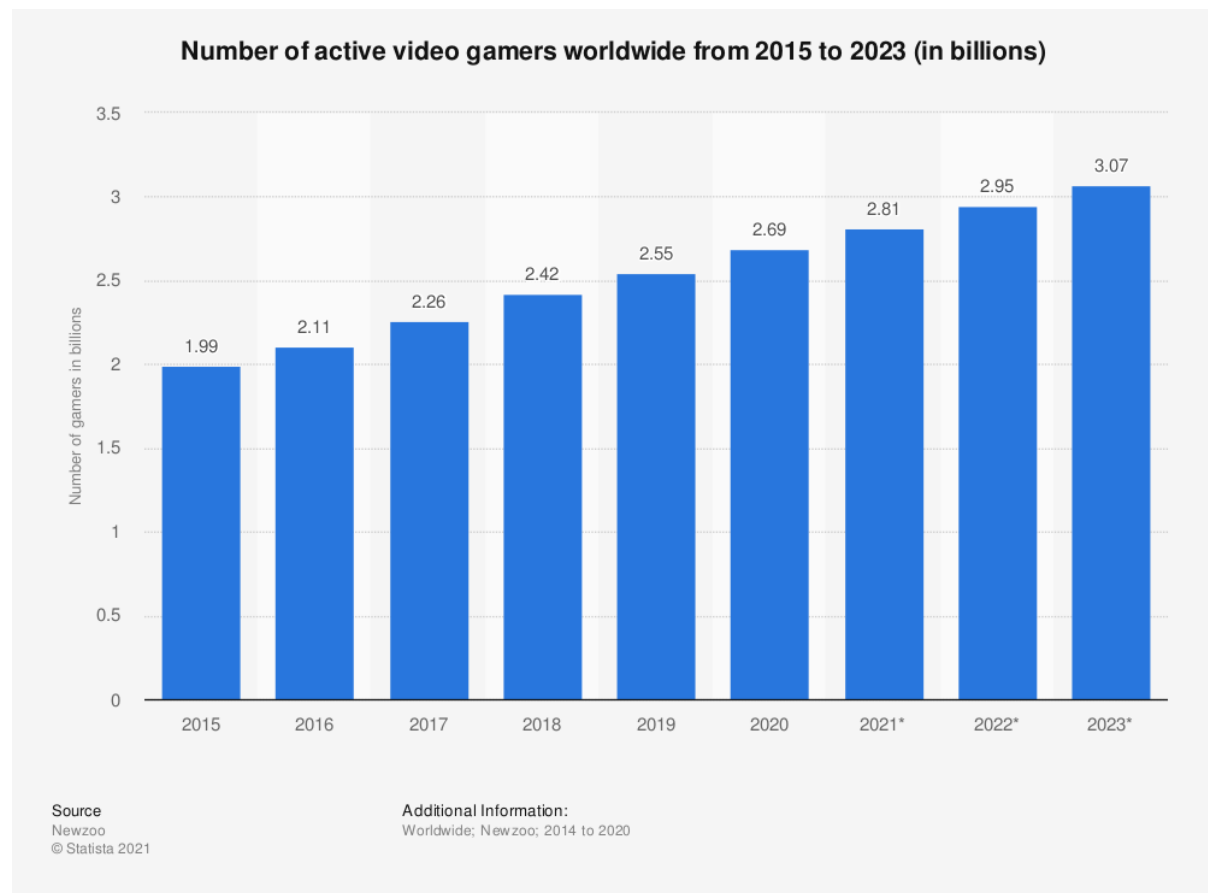
Source: Newzoo, Statista 2021

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[4] https://www.grandviewresearch.com/press-release/global-video-game-market, *Video Game Market Size Worth $398.15 Billion By 2027 | CAGR: 12.9%,* retrieved July 20, 2020
[5]https://www.globenewswire.com/news-release/2021/03/01/2184028/0/en/Global-Gaming-Market-2021-to-2026-Industry-Trends-Share-Size-Growth-Opportunity-and-Forecasts.html#:~:text=Looking%20forward%2C%20the%20publisher%20expects,9.24%25%20during%202021%2D2026, *Global Gaming Market (2021 to 2026) - Industry Trends, Share, Size, Growth, Opportunity and Forecasts,* retrieved July 20, 2020

As we can see in Figure *2*, the number of players has increased steadily in recent years. From 2015 to 2020, Newzoo approximated a growth of 35% in worldwide players. In 2020, it is estimated that there are around 2.7 billion gamers across the globe with 1.5 billion coming from the Asian pacific region alone. Furthermore, Newzoo estimates that the number of players could even increase to three billion by 2023.

These numbers were, in contrast to other industries (aviation, tourism, event management, etc.), not negatively affected by the COVID-19 virus. On the contrary, due to the imposed confinements worldwide, people allocated their time primarily to video streaming platforms and video games, causing an increase of 41% in terms of Daily Users Active (DAU) for HD games compared to the 2019 baseline.[6] DAU's for mobile platforms increased by 23 % for the same observed period.[7&8] (*COVID-19's Impact on the Gaming Industry: 19 Takeaways*, 2020)

1.2.1 eSports

The growth of this industry has also led to the rise of another multimillion-dollar discipline that has grown steadily in recent years: eSports. The main essence of eSports is identical to that of traditional sports. Players train to become better, clubs are created and tournaments are organized so that players can compete against each other and countless fans enjoy watching their game being played at a highly competitive level. From a historical point of view, competitive games were organized in university labs, started to get popular in amusement parks and then went on at LAN-parties and on the internet (Ströh, 2017). In recent years however, eSports started to become a new medium of the sport that is attracting millions of viewers and filling up large arenas for live competitions. In fact, some of the numbers only show profitable this market has become and what potential lies within:

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[6] In the report from Unity "HD" refers to PC, macOS, and other desktop platforms like Linux (with graphics typically rendered in high definition).

[7] Mobile refers to iOS, Android, and other smartphone devices in the report from Unity

[8] To get normalized performance, Unity takes raw metrics for 2019 and 2020, then compares them against the first week of each year. The first week of the year is used as baseline and compared to the performance of subsequent weeks as a percentage above or below that baseline.

- In 2021, the global eSports market was valued at just over 1.08 billion U.S. dollars and it is estimated that the global eSports market revenue will reach almost 1.62 billion U.S. dollars in 2024.[9]
- In 2020, the estimated audience size for eSports worldwide was around 397.8 million and is estimated to increase to around 577 million by 2024.[10]
- The prize pool for the leading eSports tournament "The International 2019" was 34.33 million dollars.[11]
- The most valuable eSports organizations worldwide like TSM (410 Mio USD), Cloud9 (350 Mio USD), Team Liquid (310 Mio USD) and Faze Clan (305 Mio USD) have an aggregated value of 1.375 billion USD.[12]
- Sponsorship and advertising spending on the eSport market amounted to 193 Mio USD in 2018 and are estimated to be around 634 Mio USD by 2023.[13]

These staggering numbers only show the commercial success of the video game industry as a whole.

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[9] https://www.statista.com/statistics/490522/global-esports-market-revenue/, *eSports market revenue worldwide from 2019 to 2024,* retrieved May 2, 2021

[10] https://www.statista.com/statistics/1109956/global-esports-audience/, *eSports audience size worldwide from 2019 to 2024,* retrieved May 2, 2021

[11] https://www.statista.com/statistics/517940/leading-esports-tournamets-worldwide-by-prize-pool/, *Leading eSports tournaments worldwide as of April 2021, ranked by overall prize pool*, retrieved May 2, 2021

[12] https://www.statista.com/statistics/1129707/esports-organizations-value/, *Most valuable eSports organizations worldwide in 2020*, retrieved May 2, 2021

[13] https://www.statista.com/statistics/1129550/esports-spending-advertising-sponsorship/, *Sponsorship and advertising spending on eSports worldwide from 2017 to 2023*, retrieved May 2, 2021

1.3 Business Model Canvas of video game industry

Second, it is necessary to illustrate what the business models look like in this rather specific industry as their utilized monetization models are significantly different (Davidovici-Nora, 2014).

To illustrate this business model and to have a better overview of the gaming industry, we will elaborate a Business Model Canvas (BMC) (Osterwalder & Pigneur, 2010). BMCs are a great way to visually structure existing and new business models (Hong et al., 2013). In addition, and in the framework of this thesis, some of the components will already greatly serve as an elaboration point for some of the key elements in relation to microtransactions. The components of the BMC are enlisted and explained below, and its summary can be found in the appendix. [14]

1.3.1 Key Partners
(Marchand & Hennig-Thurau, 2013)

Describes the network of partners and suppliers that make the business model work (Osterwalder & Pigneur, 2010). In the video game industry the main actors are the content providers (e.g. game producers like Activision), the platform providers (e.g. Sony and their PlayStation) and the customers. They are all interrelated and are represented in Marchand & Hennig-Thurau's (2013) framework on a vertical path that is interlinked with a horizontal one, focusing mainly on the game platforms (*see Figure 3 - Conceptual framework of value creation in video game industry*).

Nowadays, consumers can choose among a variety of gaming platforms as there are game home consoles (e.g. Microsoft's Xbox, Sony's PlayStation) as well as handheld systems (e.g. Nintendo's DS, Sony's PS). Adding the increasingly powerful smartphones that allow to play variations of popular console games titles, the number of key actors and partners within the "gaming platform" spectrum is huge.

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[14] See appendix 9.1 BMC of video game industry

Same goes for the game content providers that englobe countless game producers such as Nintendo (who can be game content provider and game platform provider), Valve Corporation, Rockstar Games, Electronic Arts, Activision Blizzard and many more.

What characterizes this market and the interrelationship between its key partners, are the indirect network effects between the consumers and the content and platform providers.[15] In fact, several studies stress that the gaming market is two sided and that there is a connection between game platform (hardware) and game content (software) sales. In this case, this means that hardware producers such as Microsoft for instance, earn money from selling consoles to consumers (market 1) and from selling game licenses to game producers (market 2), meaning that a gaming platform with more consumers is more attractive for game producers and vice-versa.

Figure 3 - Conceptual framework of value creation in video game industry
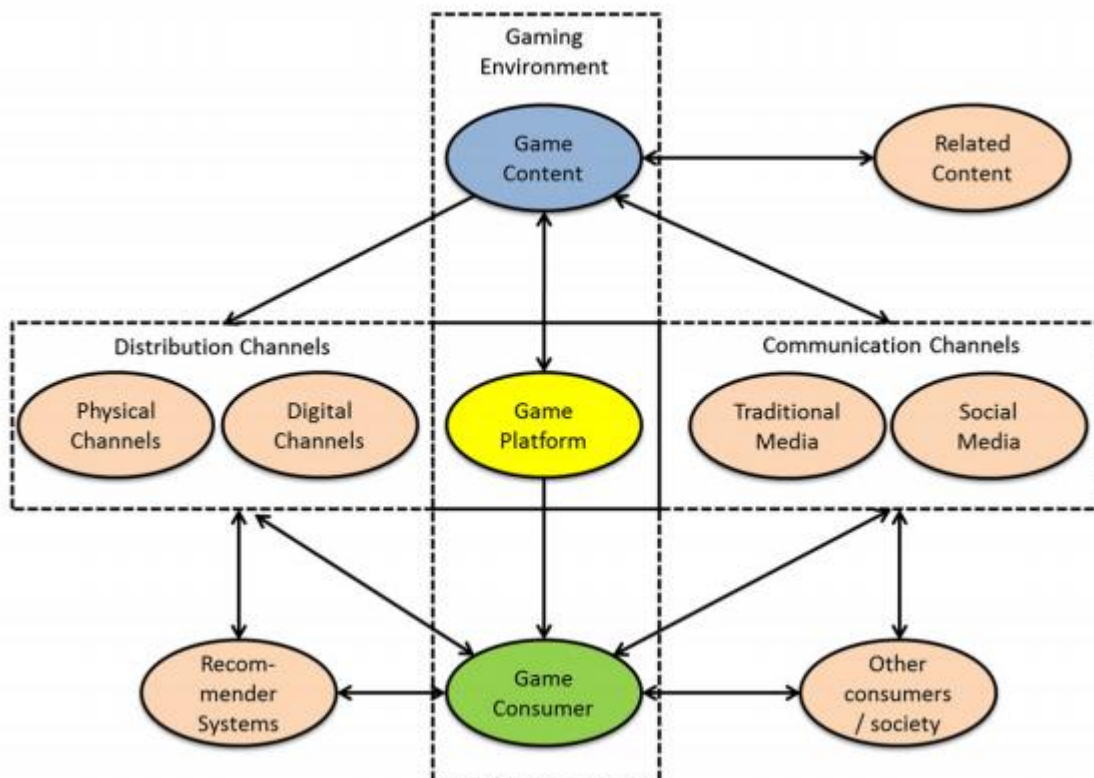
Source: adopted from Marchand & Hennig-Thurau (2013)

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[15] Indirect network effect: an increased variety of one product (software titles in the context of games) increases the value of another product (a console) for customers, which in turn can have an effect on the first product (through an increased attractiveness for game producers)

[18]

The horizontal path refers to the channels of distribution and communication that link the content providers to the customers.

Furthermore, this framework acknowledges 2 additional institutions (represented as "related content" and "recommender systems" on the figure) as key partners for the video game industry:

1. The entertainment industry (e.g. motion pictures): Generate related content which can provide a source of inspiration for video games (e.g. adaption of film narratives)
2. Recommender systems: Serve as important sources of information systems that consumers seek to find the "right game"

The third section "Other consumers / society" considers the influence of consumers on the decisions of an individual (word-of mouth, observational learning, etc.) and therefore does not constitute a key partner in this industry per se.

1.3.2 Key Activities

(Klimas, 2018)

Describes the most important activities that a company must do to make its business model work (Osterwalder & Pigneur, 2010). In her research Klimas (2018) conducted an in-depth analysis of the key activities that game developers undertake. These activities, that have emerged from interviews with 13 different game developers that she conducted, differ according to the 3 monetization models they belong to: Premium, freemium and hybrid – models (Davidovici-Nora, 2014).

Table 1 - Summary of monetization models used in video game industry

Premium monetization models	Freemium monetization models	Hybrid monetization models[16]
Development and selling of paid games [17]	Development and free delivery of games Benefits provided from in-app purchases/ in-game advertisements[18]	Mix of premium and freemium model by selling paid games and profiting from in-app transactions/advertisements

Source: adopted from Klimas (2018)

In general, the developer's core tasks are nearly identical, no matter which business model is used. Their key activities are related to intra-industry networking, customers (which includes user acquisition, customer retention and relationship and community management), business relationship management (e.g. publishers, hardware manufacturers or other game developers) and nearly (if not all) stages of the game development. Lastly, Klimas also identified some managerial related key activities such as marketing, quality improvement and staff management.

Even though the core activities between the models remain roughly the same, their importance within the models themselves differs. While game developers that rely on the premium model (which constitutes the oldest one) focus more on community, business relationship management and game development, freemium model centred developers consider customer retention, game development and project management and selective customer management as their key activities. Interestingly, customer retention accounts as the most important key activity for this kind of model and is considered as more important than the actual development of the game.

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[16] Hybrid models constitute a novelty in video game research as prior research has mostly focused on premium and freemium models (Davidovici-Nora, 2014; Hamari et al., 2017)

[17] Game development includes game creation, production, distribution and internal communication for instance

[18] See 2.1 Definition and type of microtransactions

Developers using the hybrid monetization model on the contrary seem to be the ones that are focused the most on relationship building as their key activities emphasize more on establishment, management and maintenance of external relationships.

In the context of this thesis, our findings could be especially interesting for the hybrid and freemium business models as the latter especially benefits heavily from in-app purchases/advertisements and centres its whole business strategy around them.

1.3.3 Key Resources
(Klimas, 2018b)

Describes the most important assets required to make the business model work. Most of the time, the key resources of a company or an industry can be informational, human, financial and physical. These resources can take many different forms as they are not identical within the industries or competitors (Osterwalder & Pigneur, 2010). Game developers don't differentiate between human and information (knowledge) resources as they see information knowledge and people as inseparable and therefore fully integrated to each other. Regardless of the business model (freemium, premium, hybrid), video game developers consider human and information resources as most important in their hierarchy and point especially at the importance of a tacit, experience-based knowledge and expertise accumulated in employees.

As the video game industry can be considered as a very knowledge-intensive and creative industry, it relies primarily on the expertise and competency of its people to deliver value creation. Financial resources are important as well as they constitute important means to acquire other resources, especially to hire the right people.

Physical resources (e.g. computers, hardware, electronic devices) seem to be the least important ones according to Klimas study and its low importance can be explained by the easy accessibility to it.[19]

Additionally, video game developers seem to require another important resource that is not traditionally mentioned in the literature by Osterwalder & Pigneur (2010): resources related to external (business and social) relationships and networking. This includes for instance relationships with gaming communities, relationships aimed at outsourcing the game production or intra-industry relationships for instance.

1.3.4 Value Proposition

Describes the bundle of products and services that create value for a specific customer segment and constitutes the reason why customers choose one product over another (Osterwalder & Pigneur, 2010). In the past, games have commonly been seen as a singular type of technology that seems to serve one purpose : "*Gamers just want to have fun*" (Wu & Li, 2007; Yoon et al., 2013). Nonetheless, it is clear that games are much more multifaceted types of information systems that prove to be much more ambiguous in theory (Hamari & Keronen, 2017). Thus, they satisfy a bunch of different needs that can differ from each person to another (Kowert, 2017). Players can see video games as a great way to empower themselves in relation to recognition and control for instance (King & Delfabbro, 2009).

The recognition is manifested through experiencing a feeling of mastery over the virtual properties of the video game environment as well as in the sense of contextual status or rank that can be either provided with feedback through the game itself or in relation to other users.

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[19] According to Klimas' study (2018), some game developers even get a lot of the physical resources (e.g. devices, computers, hardware) for free and before they even enter the market.

Many gamers feel a sense of fulfilment when rewarded or recognised for having invested tens to hundreds of hours playing video games (e.g. through the attribution of a special in-game rank or title within the game, the possession of unique items).

This sense of fulfilment also plays an important role in the context of microtransactions when players show off the possessions or ranks they obtained through their hard work for instance. The control refers to the notion that video game users are granted a strong sense of personal agency within the game context (e.g. by controlling the outcome of in-game events using personal strategy).

King & Delfabbro (2009) found several other values that were provided by the video games (hence video game developers): Immersion for instance plays an important role as players are actively involved in the game. Moreover, video games undeniably feature numerous advanced social utility functions that connect people through social networks and online communities (e.g. cooperating to finish the game, competing against each other, meeting online to discuss different subjects). Within these networks and communities, people create their own identities, which in consequence reinforces the feeling of "*togetherness*" and even leads to the feeling of "*social responsibility*" (e.g. being part of a clan in an online community).

1.3.5 Customer relationships

Describes the type of relationships a company establishes with a specific customer segment (Osterwalder & Pigneur, 2010). Big video game developers have many loyal customers that are truly passionate about their products and brands. Especially in terms of microtransactions this strong loyalty can play a huge role as customers can be tempted to buy the games and microtransactions without bothering too much about the quality of the game.

Nonetheless, loyalty is crucial in an extremely competitive market such as the video game industry, where there are countless releases each year and the life cycle of the products is short. As a consequence, customer relationship management is crucial (Albuquerque et al., 2015).

[23]

These relationships can take many forms and can be handled through technical support by utilizing communities in which personal assistance is provided (self-created like Discord or externally created like Reddit) for example.

As already stated in the component of the key activities, their main drive is composed of retaining customers, and also acquiring them. Some game developers focus on maintaining a very active relationship with their customers through co-creation (e.g. creating especially dedicated communities in which the game developers collect the feedback of the users directly and exchange with them). This type of co-creation can take the form of a poll for example where the developers ask their customers what type of cosmetic microtransaction should be in included in the future.[20]

1.3.6 Channels
(Marchand & Hennig-Thurau, 2013)

Describes how a company communicates with and reaches its customer segments to deliver the value proposition (Osterwalder & Pigneur, 2010). In general, there are 2 channels through which game developers communicate with their customer segments: traditional media[21] and social media. For the developers it is important to boost the sales by creating buzz and hence increase the anticipation of a game in the pre-release state as its development costs are high. This is mostly done via investing significant amounts in advertising in traditional media, which can vary according to the state of the release.

Naturally, as social media has developed as an essential part of the marketing strategy that helps co-creating value nowadays (Vinerean, 2017), some major game brands started to use this medium to communicate with their customers as well (e.g. through Twitter).

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[20] Cosmetic microtransactions are in-game purchases that allow the players to customize an avatar for instance. This term will be explained more in detail in 2.2.5 Cosmetic and Pay-To-Win - purchases.
[21] Includes television, radio, newspapers and magazines

Consumers use these channels not just to get information from the developers themselves but share quality related information immediately after or even during their gaming experience. Obviously, consumers influence other individuals' decisions through communicative or behavioural recommendations (e.g., word of mouth, observational learning), or through their mere adaption of the game as a result of network effects.

1.3.7 Customer segments

Describes the different groups of people or organizations a company aims to serve (Osterwalder & Pigneur, 2010). As the video gaming market continues to grow, a broadening of the relevant consumer groups can be observed.

Where early console generations were appealing mostly to children and male teenagers, following generations (PlayStation) started to attract young men and also female consumers and families (Nintendo Wii and the Kinect Controller of the Xbox 360[22]) (Marchand & Hennig-Thurau, 2013). In fact, according to a study based on gamers in 13 countries and published in 2017, we can observe that the distribution of video gamers worldwide is split as follows:

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[22] With the Kinect Controller the user can control games using just his body, voice, and gestures.

Figure 4 - Distribution of video gamers worldwide in 2017
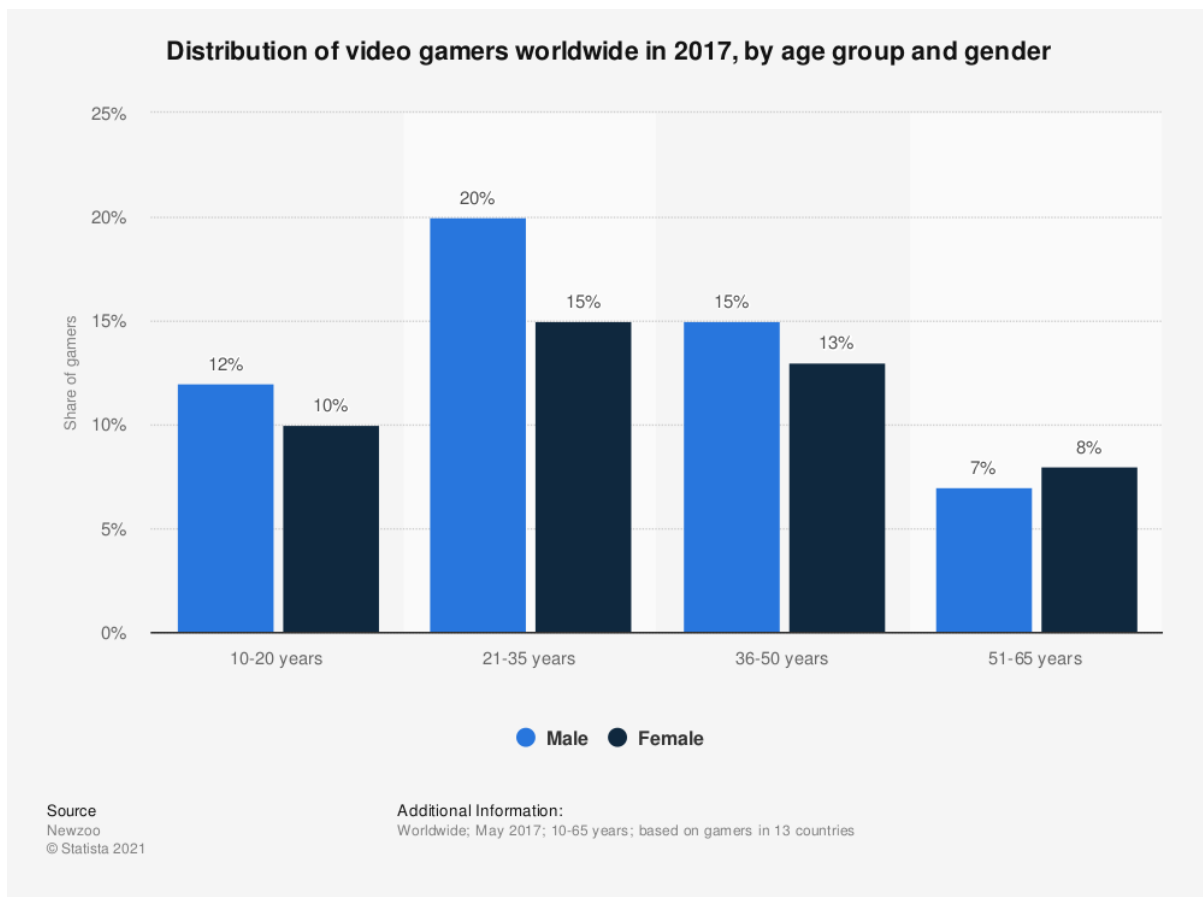
Source: Newzoo, Statista, 2021

On the grounds of this statistic, we effectively can reinforce Marchand & Hennig-Thurau's statement on the increasing broadening of relevant consumer groups.

Most of the gamers are aged between 21 and 35 years (for both genders) but other than that, the customer segment for video games in general seems to be more or less equally distributed and therefore diversified.[23] Adding the rise of smartphone games with their ubiquitous nature which require no distinct platforms and are relatively cheap, almost every consumer can be considered as a potential gamer (Marchand & Hennig-Thurau, 2013) and also as a potential microtransaction buyer.

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[23] There are some differences in the video games genres themselves for which the customer segments may differ.

1.3.8 Cost structure

(Yury & Tryfanava, 2018)

Describes all the costs involved to operate a business model (Osterwalder & Pigneur, 2010). Depending on the complexity of a game (casual, AAA level and MMO games for instance)[24] the process of game development can involve high costs. First, there are the fixed costs such as the salaries of the development team and the software, software licenses, intellectual property and data and equipment needed for the development of the game.

The salary of the development can be significant as the number of people involved in the process of creating a game can be high. Usually, these costs include the salaries of the game designers, the programmers and graphics and animation teams for instance. Developers also must account for high expenses to let the games get tested by Quality Assurance (QA) Engineers that carry out functional, regression, security and performance testing.

The use of software and the included licenses are composed of the commercial costs required for using the programs (e.g. 3D Max, Maya, Adobe Photoshop) and third-party services (e.g. PlayFab, Photon, Firebase). Copyright on pictures and music and intellectual property are included as well and can be considerably costly too.

Without even taking into consideration the advertising budget, these expenses can grow exponentially (due to team type, game design, server scaling, etc.) and lead to a striking cost structure that can reach up to hundreds of millions of dollars depending on the game. Flappy Bird, a simple side scroller[25] for instance had roughly US$300 of development costs whereas the development costs and market range for the game Destiny is estimated to be around US$500 million (which includes marketing, royalties and distribution) according to businessinsider.com.[26]

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[24] In the video-game industry, AAA (sometimes written Triple-A) is an informal classification used to categorise games produced and distributed by a mid-sized or major publisher, which typically have higher development and marketing budgets than other tiers of game.

[25] 2-D game where characters move from the left to the right side of a screen.

[26] https://www.businessinsider.com/destiny-day-one-sales-500-million-2014-9?r=US&IR=T, *Here's How 'Destiny' First Day Sales Compare To 'Halo' And Other Huge Games,* retrieved July 22, 2020

As the costs of developing video games have increased, the prices of video games have been stagnant for the last 15 years. [27] To counteract this, a lot of video games developers therefore rely heavily on microtransactions.

1.3.9 Revenue Streams
Marchand & Hennig-Thurau, 2013

Describes all the streams that generate cash for a company or industry (Osterwalder & Pigneur, 2010). The revenue streams for games were traditionally composed of a fixed price model in which the consumers would simply pay a listed price and then have unlimited time to play. Nowadays, this can be done online (purchasing the games in online stores) and of course in a classic manner (purchase at a retailer). Games that can be solely played online (e.g. League of Legends) on the contrary require periodic subscription fees to be paid. In certain games, developers opt for a hybrid version where consumers can buy the games for a fixed listed price and then pay a periodic fee in order to play it online. (e.g., Star Wars: The Old Republic).

As already mentioned in the key activities, some game developers adopt a "freemium" pricing strategy. This pricing method is commonly used in games that are played online and on social networks (e.g. Facebook) and profits from in-app sales and advertisements (Klimas, 2018). In other words, the players have free access to the game but often have to spent money to advance in the game (e.g. unlocking new levels).

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[27] https://www.bloomberg.com/news/articles/2020-11-09/game-prices-go-up-to-70-the-first-increase-in-15-years, *Video Game Prices Are Going Up for the First Time in 15 Years*, retrieved December 11, 2020

2. Microtransactions

Before analysing the problem and the research questions of this thesis, it is imperative to also define microtransactions, explain some of their key concepts more in detail and highlight their impact on the industry.

2.1 Definition and type of microtransactions

In general, microtransactions are considered as very small financial transactions that are conducted online.[28] In the gaming industry, microtransactions can be used as an umbrella term that covers a wide range of purchases within video games (McCaffrey, 2019). Schwiddessen & Karius (2018) defined microtransactions more specifically:

"Business model (…) where users can purchase virtual goods via micropayments. (…) Microtransactions (i.e., premium content) may include downloadable content such as story extensions (so called 'DLCs'), additional play time, levels, new maps, virtual currency, weapons, armour, characters, or cosmetic items to customize the player's character or items. The player pays (…) either directly with real world currency or with some form of fantasy virtual currency (e.g., gold). The latter is typically earned during gameplay or can (often alternatively) be purchased with real world money."

The word *micro* can in this case be misleading as it would indicate that these transactions are necessarily small, which is not always the case. In fact, their prices can vary drastically and range from .99 cents to hundreds or even thousands of dollars with no upper limit that is fixed (Agarwal, 2017).

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[28] https://www.lexico.com/definition/microtransaction

2.2 Types of microtransactions

As stated in the definition of Schwiddessen & Karius, there are some significant distinctions to be made in the categories of microtransactions that exist. Typically, we distinguish between 4 types of microtransactions (Duverge, 2016):

2.2.1 In-game currencies

This type of microtransaction is the most common that can be found and constitutes a virtual currency in a game that can be purchased via real world currency (Ivanov et al., 2019). Sometimes, in-game currency can be earned through gameplay or watching advertisements. It can take different forms and include for example silver, credits, gold, bottle caps or credits and is often needed to gain access to premium content to the game (Ivanov et al., 2019). The developer Konami for instance offers 7 packages with in-game currencies for the game eFootball PES 2021 Season Update that allow the player to buy in-game items (players, kits, coaches etc.):

Figure 5 - Example of virtual currency packages

Source : https://store.playstation.com/en-us/search/myclub
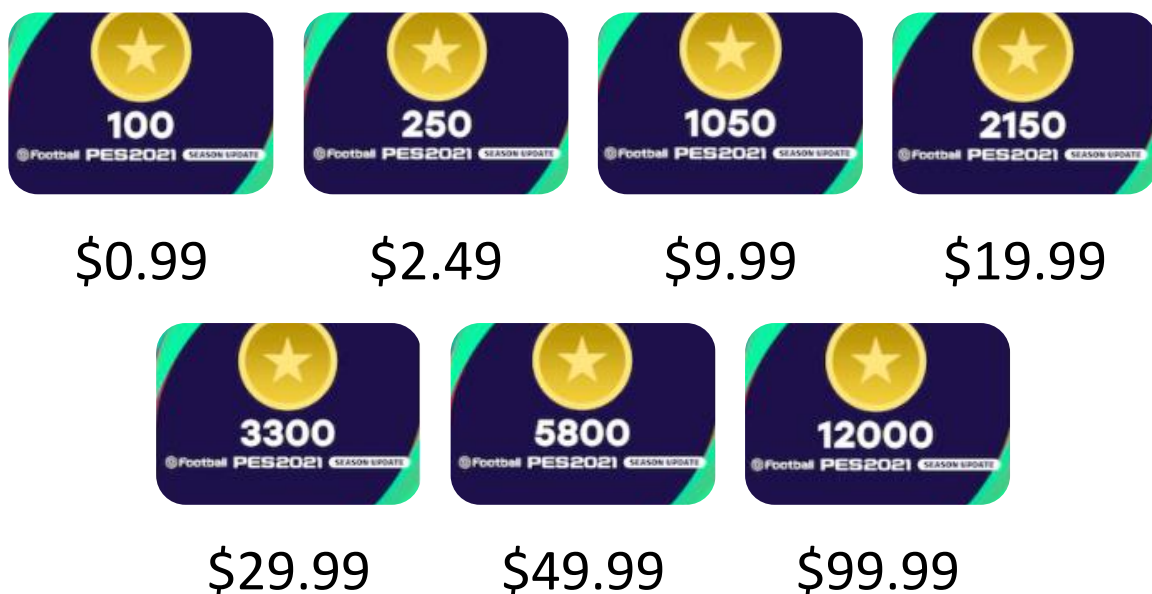
As illustrated in figure 5, these packages are often offered under a volume discount, meaning that the price per unit decreases when bought quantity increases. In this specific example, the price per unit varies from $.0099 for 100 myClub-coins[29] to $.0083 for 12 000 myClub-coins.[30]

This pricing model is also used commonly in other video games (e.g. For Honor, Fortnite). According to Ivanov et al. (2019) this pricing model can lead to confusion as in-game currency procures no possibility to measure real value.

2.2.2 In-game items

This category of microtransaction englobes generally upgrades that are relevant to the game and can be obtained in exchange for real life-currency or in-game currency (Ivanov et al., 2019). Generally, these items are better than the free game content (Duverge, 2016). Here, the user knows the content of the purchase beforehand and can procure himself a competitive advantage for instance.

2.2.3 Time limited in-game purchase

Encompasses offers to purchase items that have a limited time duration and allow the player to speed up their progress. After a certain period of time, these items need to be repurchased to reactivate the bonus (Duverge, 2016).

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[29] $0.99 / 100

[30] $99.99 / 12 000

2.2.4 Random chance purchases

Also called "*loot boxes*", "*loot crates*" or "*prize crates*" are defined by Schwiddessen & Karius (2018) as "*consumable virtual items which can be redeemed to receive a randomized selection of further virtual items, ranging from simple customization options for a player's game character, to game-changing equipment such as weapons, armour, virtual currency, additional skills, and even completely new or exclusive characters.*"

As pointed out, a further distinction has to be made within these loot boxes as they contain different types of content (Schwiddessen & Karius, 2018): The ones that consist of so-called cosmetics that provide items that are solely used to personalize the gaming experience (e.g. skins for your avatar, unlocking of a new character) and the ones that accommodate items generating gameplay progress (e.g. levelling up character without playing, skipping a level). Latter are also widely known as pay-to-win methods (PTW) and will be explained more in detail later on. These 2 types of microtransactions will constitute the basis reference of our analysis later on.

In contrast to the 3 aforementioned types of transactions, here the players only know what type of content they get after the purchase. Typically, loot boxes can be obtained in four ways:

Figure 6 - Pathways to accessing loot boxes
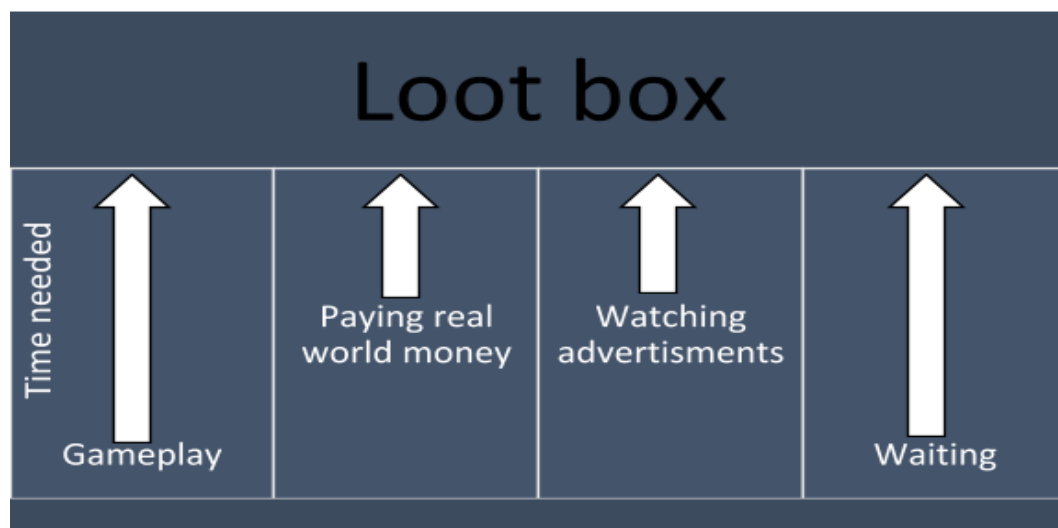
Source : adapted from (Cerulli-Harms et al., 2020)

[32]

Most of the time, players gain access to loot boxes through their own gameplay and are rewarded with them after completion of certain tasks or quests. Waiting times are another possibility of allowing players to obtain these items as some game developers tend to insert prize crates that are just eligible once a day. As shown in Figure 6 - Pathways to accessing loot boxes, these pathways constitute the ones with the longest needed times unless the player decides to pay for the loot boxes with real-world money or by watching advertisements. This reduces the time the player needs to spend playing the game and constitutes a considerable shortcut in obtaining the loot box.

2.2.5 Cosmetic and Pay-To-Win - purchases

As defined by Marder et al. (2019), cosmetic microtransactions are purchases that allow players to decorate and create alternate costumes that "*offer no in-game advantage and are purely aesthetic*". Cosmetic microtransactions can take on many forms and vary considerably from game to game. For example, in the hugely successful multiplayer battle royal game Fortnite, players can spend real-world money to buy in-game "*emotes*" that allow them to express ideas and feelings via the movements of their in-game avatar. In the soccer game Rocket League, players can purchase new "*goal explosions*" that allow them to celebrate their in-game victory with unique visual effects. As already mentioned, these purchases do not confer any in-game boosts or advantages in terms of fighting: They simply look different (Zendle et al., 2020).

In the context of this thesis, we will therefore refer to any situation in which spending additional money solely leads to an aesthetic change within a game as "*cosmetic microtransactions*".

Pay-to-win microtransactions, on the contrary, are not purely cosmetic in nature (Reza et al., 2019). Video game players have the possibility to purchase virtual items and bonuses that increase their chances of in-game success (Zendle et al., 2020).

Some pay-to-win microtransactions do not have any effect on the aesthetic of the game, such as the purchase of an "*agility perk*" in the *Last of Us* for instance. Buying this in-game item increases the ability to sneak up on other players silently for instance and procures an in-game advantage (Zendle et al., 2020). Hence, the purchase is destined to acquire an edge in the game and does not affect the aesthetic of it all.

However, there are also pay-to-win microtransactions that can change how the game looks. This encompasses for instance microtransactions that allow players to buy new in-game characters which ultimately convey an in-game advantage (e.g. Awesomenauts). Due to their uniqueness and aesthetic, these types of microtransactions have a cosmetic value too (Zendle et al., 2020).

For this thesis, we define any situation in which players exchange real-world money for something that increases their chances of in-game success as a "*pay-to-win microtransaction*", no matter if an aesthetic element like in the example above is included or not.

2.3 The rise of microtransactions

Microtransactions are an underlying element of the videogame industry and have therefore also experienced a meteoric rise over the recent years. According to Tomic (2017) and data provided by PriceWaterHouseCoopers the revenues from microtransactions on the video games market in the USA have increased more than sixfold from 2010 to 2014. In 2010 for instance, revenue generated through the sales of microtransactions on console games were equal to 92 Mio USD. In 2014, this number went up to 574 Mio USD. Unfortunately, no recent and comparable data could be found for the following years but we can safely assume that the generated revenues through microtransactions are significantly higher nowadays given their omnipresence in video games. In a study conducted in 2019 for example, 87% of 994 respondents in a survey indicated that they concluded a microtransaction, showing that nearly 9 out of 10 players have purchased an in-game item.[31]

In terms of exposure, Zendle et al. (2020) found out that especially loot boxes and cosmetic microtransactions have grown rapidly from 2012 to 2014 leading to high levels of exposure by April 2019: In their study, 71.2% of the sample played games with loot boxes at this point, and 85.89% played games with cosmetic microtransactions.

Especially free-to-play models profit the most from this upwards trend as they offer their games for free and therefore depend on the sale of in-game items. These revenues can be significant and reach millions of dollars. In fact, from January to April 2020, the mobile version of Fortnite for instance, generated more than 110 Mio USD in revenue through microtransactions alone.[32] Even though no official numbers concerning the overall revenues generated by the sale of in-game purchases can be found, the generated revenue for the console and PC version can be estimated as considerably higher.

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[31] https://www.statista.com/statistics/274130/purchased-virtual-gaming-items-and-content-in-the-us/, *Share of gamers who purchase downloadable content in the United States in 2019,* retrieved April 22, 2021

[32] https://www.statista.com/statistics/1118517/fortnite-mobile-player-spending/,*Player spending on Fortnite Mobile worldwide from April 2019 to April 2020,* retrieved April 22, 2021

In May 2018 for instance, the revenues for the console and PC version of Fortnite amounted to 318 Mio USD. [33] Once more, we can observe significant numbers that are bound to increase dramatically in the next few years.

[33] https://www.statista.com/statistics/865601/fortnite-revenue/, *Monthly revenue generated by Fortnite worldwide from February to May 2018,* retrieved April 22, 2021

[36]

3. Research questions

As previously illustrated in detail, both the presence of video games and microtransactions becomes more and more significant in this rapidly growing industry. Consequently, both of these notions and their relationship deserve more scholar attention as especially pay-to-win microtransactions have been subject to a lot of controversy in recent years. Given the fact that both these concepts are interrelated and co-dependent on their player base, the relationship between them is questioned in the following manner:

What is the impact of microtransactions on the video game experience for the players?

In the context of this thesis, this question does not refer to the technical aspect of microtransactions as its purchase obviously has an impact on the video game experience. Players buy in-game items which are then used in the game. Naturally, this alternates the video game experience solely from a technical point of view as a new element is added to the video game. The aim of the question is therefore rather to focus more on how microtransactions can influence the perception of the game itself and whether they have an impact on the player and his intention to play the game. More precisely, we want to find out if there is a difference between 2 important types of microtransactions: Cosmetic and Pay-to-win microtransactions.

As already pointed out, it is especially the pay-to-win microtransactions that have garnered controversy amongst gamers (Zendle et al., 2020). The reasons for this are multifaceted: While some academics provide critiques based on the ethical aspects where the game is changed *"from a competition where the best player wins to (…) who wants to and can pay the most"* (Heimo et al., 2018), others claim that this model makes games unfair for the less fortunate players (Alha et al., 2014).

In the context of this thesis and to simplify the formulation of our research questions and analysis, we separated the term microtransaction into 2 main categories (referred as "PTWMTX" and "CTMX") in the way that they are generally perceived by the gaming community (Zendle et al., 2020). As a reminder, their characteristics can be quickly summarized as follows:

Table 2 - Distinction between PTWMTX and CMTX

Microtransactions (MTX)	
Pay-to-win (PTWMTX)	**Cosmetic (CMTX)**
Purchases that procure a competitive advantage	Purchases that procure the possibility to personalize the gaming experience without giving any competitive advantage
Examples: Levelling up character without playing, skipping a level, acquiring a stronger avatar, etc	Examples: Skins for your avatar or weapons, emotes, celebrations, decals, etc.

Given their different natures, the underlying question therefore is:

Is there really a difference in the perception between CMTX and PTWMTX for the players?

Until now, no specific research has been done to distinguish the perception between these 2 types of microtransactions, even though there seems to be an important distinction to be made. To be more specific, we want to find out if players enjoy a game less or more depending on the type of microtransaction. In this context, we can also study whether the type of microtransaction influences the willingness of a player to play a game or not. Moreover, we also want to identify whether microtransactions really influence the perception of the gameplay for its users.

There are theories hovering around in online gaming communities that certain types of microtransactions influence the gameplay heavily.[34] Even though we would like to intensify our research on this topic and find out whether microtransaction may alter the core gameplay mechanics arbitrarily or not, we are in no measure to provide proof for this. Hence, we can only focus on the perception of the gameplay in relation to microtransactions. For that matter, these statements lead us to the following questions:

Does the type of microtransaction influence the enjoyment of a game?
Does the type of microtransaction influence the willingness to play a game?
Does the type of microtransaction influence the perceived gameplay of a game?

Additionally, we also want to find out how microtransactions are perceived in general, namely in their usage and price. As microtransactions can range from .99 cents to hundreds of euros, it would be interesting to see how their prices are perceived, especially as the players are not limited in their choices. We are therefore also going to focus on the following questions :

How is the buying and usage process of microtransactions perceived?
How are the prices of microtransactions perceived?

Another important type of microtransactions that has been subject to a lot of criticism in recent years are loot boxes. But because they usually contain both cosmetic and pay-to-win microtransactions and have a questioned legitimacy, they are not subject to the research questions and analysis.[35]

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[34] https://cultureofgaming.com/does-the-pay-to-win-model-hurt-the-gaming-industry/, *Does the Pay-To-Win model hurt the gaming industry,* retrieved February 12, 2021

[35] In Belgium for instance, loot boxes have been banned by the government.

CHAPTER B) PRACTICAL PART

4. Methodology and results of analysis

4.1 Methodology

4.1.1 Methodological approach

In order to explore this rather under-researched topic, we have to consult different resources as our questions are centralized primarily around the context of user acceptance. Hence, our research question can be transposed into that concept and seen as follows :

How are microtransactions perceived and to what extent are they accepted by the users?

Measuring user acceptance of information systems accurately has been an important and long-standing research question (Delone & McLean, 1992). Generally, in this area, a commonly used model is Davis' technology acceptance model (TAM). According to (Davis, 1989), user acceptance can generally be explained by two factors: Perceived usefulness (PU) and Perceived Ease of Use (PEU). Perceived usefulness can be defined as "*the degree to which a person believes that using a particular system would enhance his or her job performance*" (Davis 1989, p. 320) whereas perceived ease of use is explained as being "*the degree to which a person believes that using a particular system would be free of effort*" (Davis 1989, p. 320).

The issue with the traditional TAM is that it fails to include intrinsic values, which is a main incentive in the adoption and use of Hedonic Information Systems, to which video games undoubtedly belong to. For our thesis, the original TAM scale for perceived usefulness was problematic because it could not be adapted well to the hedonic nature of the information under study and was therefore not included.

To counter the lack of intrinsic value inclusion, van der Heijden, (2004) developed a hedonic-system acceptance model that would predict behavioural intentions to use (BIU), by using enjoyment as the main component for measuring intrinsic motivation. This variable, which is defined as "*the extent to which the activity of the computer is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated*" (Davis et al. 1992, p. 1113) is more predominant when used apropos hedonic information systems, such as games (van der Heijden, 2004;Venkatesh & Davis, 2000).

Since MTX constitute an integral part of games, they therefore can be categorized as hedonic information systems. The perceived enjoyment was therefore measured using four differential scales which were taken from enjoyment research (Cheung et al., 2000; Igbaria et al., 1995) and adopted accordingly to the category of microtransactions and video games.

To measure PEU and BIU, we took the measures from different TAM models (Venkatesh & Davis, 2000; van der Heijden, 2004) and adapted the scales accordingly. It is also important to note that we interpret the Behavioural Intention to Use as Behavioural Intention to replay a game.

As of now, there is no literature or data discussing the impact that 2 different types of microtransactions (PTW and cosmetics) have on the gaming experience. While Yoon et al., (2013) sought to examine the factors affecting the acceptance of an entertainment medium, particularly online games, their study does not include microtransactions at all. Zendle et al. (2020) on their side analysed the rise of exposure in PTW and cosmetic microtransactions during the last years but did not analyse the way these were perceived.

Evers et al. (2015) for instance tested whether the use of these PTW microtransactions would affect how players perceive other players using them. They found out that players respond negatively to other players who buy functional benefits in games, which suggests that PTWMTX are negatively perceived in the gaming community.

Moreover, (Milner, 2013) disclosed that some players felt that because of audience convergence, the integrity of the game had been sacrificed when the developer emphasized microtransactions. According to his study, the players perceived the game as becoming ''*dumber*,'' and considered themselves ''*nickel and dimed*'' if they wanted a complete and enjoyable experience.

Adding to this the negative backlash several developers received for introducing PTW systems in their games (e.g. EA, Activsion)[36&37] and that for hedonic systems, perceived enjoyment is a strong predictor of behavioural intention to use (van der Heijden, 2004), we can hypothesize the following 2 statements:

H1: Buying a PTWMTX negatively impacts Perceived Enjoyment (PE)
H2: Buying a PTWMTX negatively impacts the Behavioural Intention to Use (BIU)

Analogously and even though we have no literature or data studying specifically the impact of CMTX, we can assume that their perception amongst players is rather positive, or at least better than the one of PTWMTX. Subsequently, these types of microtransactions do not offer any competitive advantages when playing the game and are solely used to personalize the gaming experience. Considering these facts, we therefore can hypothesize the following statements:

H3: Buying a CMTX positively impacts Perceived Enjoyment (PE)
H4: Buying a CMTX positively impacts the Behavioural Intention to Use (BIU)

To find the relevant variables to answer to the other research questions we stated, namely the perceived playability and the perceived costs, we have to consult different resources that are not in relation with the TAM.

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[36] https://www.businessinsider.com/star-wars-battlefront-2-ea-apologizes-for-loot-box-fiasco-2018-4?r=US&IR=T, *EA apologize for loot box fiasco,* retrieved November 23, 2020
[37] https://www.msn.com/en-us/money/other/warzone-fans-criticize-developers-for-pay-to-win-mac-10-blueprint/ar-BB1cDmER, *Warzone fans criticize developers for pay to win models,* retrieved November 23, 2020

Considering the perceived playability, we'll focus on 3 aspects that are important for the core gameplay mechanics: The difficulty, the responsiveness and the overall playability. As no specific research has focused on such a variable, we will try to elaborate one by aggregating them. In his paper on playability in Action Video Games, Fabricatore et al. (2002) stated that "*a game should provide challenges of intermediate difficulty for the player*" when talking about video game design. This implies that players don't want to face challenges that are too difficult to overcome as this may frustrate them. On the contrary, players seek to be challenged, meaning that the imposed challenges should not be too easy.

Responsiveness is measured by the response time which can be simply translated as the time between the input of the player (pressing a button on the controller) and the results appearing on the screen (e.g. bullet being fired). Lastly, playability simply refers to the gameplay as it is overall perceived by the player. Considering the theories hovering around in different forums that PTWMTX decrease the input time[38], hence simultaneously increasing the perceived difficulty and decreasing the playability of the game, we would like to test the following hypothesis:

H5: Buying a PTWMTX negatively impacts the Perceived Playability (PP)

As cosmetic microtransactions have no impact on the core gameplay mechanics, we could consequently assume that:

H6: Buying a CMTX does not significantly impact the Perceived Playability (PP)

Most of the games, no matter if triple A (e.g. GTA), indie[39] (e.g. Fall Guys) or – smartphone games (e.g. Candy Crush), have integrated in-game shops that contain all the types of microtransactions displayed in a user friendly and easily accessible manner.

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[38]https://www.reddit.com/r/FIFA/comments/7fo6uc/is_input_lag_and_sluggish_gameplay_deliberately
[39]Video game typically created by individuals or smaller development teams without the financial and technical support of a large game publisher

Generally, in these shops, the procedure of making a microtransaction is the same and pretty straightforward, no matter which type of in-game item is bought (e.g., going to the in-game shop, selecting the required item and then either paying with in-game currency or credit card).

Once again, there is no literature or data dealing specifically with the perceived ease of use (PEU) of microtransactions. Yet, due to user friendliness ,accessibility of said shops and the rise of microtransactions in the gaming industry, we can assume the following:

H7: Buying a CMTX positively impacts the Perceived Ease of Use (PEU)
H8: Buying a PTWMTX positively impacts the Perceived Ease of Use (PEU)

Once again, as microtransactions remain a rather understudied topic there is no literature analysing specifically how the costs of microtransactions are generally perceived. In spite of that, we already assumed that there could be an important distinction in the perception concerning the type of microtransaction. This also true for the Perceived Costs (PCO), which can be defined as "*how the consumer considers price relative to his or her disposable income that is important*" (Moore & Benbasat, 1991). Generally, we can hypothesize that CTMX are perceived as cheaper than PTWMTX due to their nature and reputation among the gaming community. Hence, we would like to test the following hypothesis :

H9: Buying a CMTX positively impacts the Perceived Costs (PCO)
H10: Buying a PTWMTX negatively impacts the Perceived Costs (PCO)

To test these hypotheses, we will collect numerical data through an online survey that will contain several 5 Point-Likert scales that will allow us to do a regression analysis.

The results of the regression then help us to determine whether a hypothesis could be confirmed or not.[40&41]

Due to the complexity and time constraints, we will not model the TAM via a so-called Structural Equation Models (SEM) as it was initially planned. SEMs are a great way to model the relationships between variables and ultimately measure the behavioural intention to use (to play the game). According to Schumacker, R & Lomax, R (2004) in their *Beginner's guide to Structural Equation Modelling (Third Edition*) a SEM "*uses various types of models to depict relationships among observed variables, with the same basic goal of providing a quantitative test of a theoretical model hypothesized by the researcher*".

Specifically, this model can test various theoretical models that hypothesize how sets of variables define constructs and how these constructs are related to each other. The aim of the analysis is "*to determine the extent to which the theoretical model is supported by sample data.*" (Schumacker, R. & Lomax, R., 2004)

As a consequence, a SEM is able to test theoretical models by using the scientific method of hypothesis testing to advance the understanding of the complex relationships among constructs (Schumacker, R. & Lomax, R., 2004). Principally, SE models can test various types of theoretical models, such as basic models (which include regression), path and confirmatory models. This would have been very interesting in the context of this thesis, but its implementation was not possible due to the involved preparation and complexity.

We therefore aimed to use the concept of the TAM solely for its inherent constructs and to identify the relevant variables, namely the PE, PEU and BIU and test our hypothesis. It is also important to state that our hypotheses were formulated under the pretence that buying the microtransactions automatically means that they would be used as the purchase usually activates the in-game item automatically for the user.

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[40] The methods of data collection will be explained more in detail in 4.1 Methodology
[41] An overview of the variables used can be found in appendix 9.2 Instruments overview

4.1.2 Methods of data collection

Quantitative survey (Döring et al., 2016; Wolf, 1995)

In the decision-making process regarding the research method, there are numerous methods and procedures available that can be characterised as either qualitative or quantitative research methods. The decision in favour of one or the other direction is always accompanied by a specific methodological approach to the object of research.

Briefly speaking, qualitative analysis constitutes a scientific method used to gain insights into decisions or motivations of the respondents. The main goal is to collect and analyse verbal data through different methods such as individual conversations, group interviews or observations. Qualitative research is therefore suitable for all types of information that cannot be measured. As a consequence, it cannot be represented numerically.

Since we plan to do a regression analysis which can only be done using numerical data, a qualitative research method was not possible.

In contrast, quantitative research aims to make social conditions measurable. In simpler terms, the results of the research can be expressed statistically in numbers. Ideally, the quantitative research process follows a predetermined pattern.

To this extent, theories and models about the subject of the research must already be available at the beginning of the research process. Following on from this, hypotheses are deductively derived and afterwards tested in the research process. For this purpose, the measurable indicators are then formed and operationalised. With the help of a research design, the procedure for data collection (e.g. online survey), the dependent or independent variable and the measurement operations are determined in advance. The collected data is then evaluated using statistical methods such as linear regression for example. The degree of knowledge gained is secured by means of significance tests and the findings are finally related back to the theoretical model and interpreted.

Furthermore, we generally can distinguish between a descriptive or experimental approach. In the first, the subjects are usually measured once and the intention is to establish an association between the variables. To do so, the study may include a sample population of hundreds or thousands of observations to ensure that a valid estimate of a generalized relationship between the variables has been made. Since this is the aim of this thesis, we will adopt this approach. The second method charts a different path and is based on a rather small and purposefully chosen sample population where the subjects are measured before and after a particular treatment. The aim here is to establish causality between the variables.

4.1.2.1 Online survey

To collect the data, we decided to opt for a very common data collection approach, the online survey. The platform used to conduct the survey was sphinx-campus.com.[42]

To reach a broader audience and collect data more easily, the survey was conducted in 3 languages: English, French and German. Given the multilingualism of the author, no external translator was needed.

The survey was then shared on several social media accounts such as Instagram, Facebook, Reddit and Twitter and was posted generally in gaming related groups. The survey ran from the 17th of March until 1st of May 2021. To collect more responses, we also participated actively in a survey exchange platform called SurveySwap.[43] Here, the users fill out each other's survey in order to collect more responses. The survey did not target a group in terms of age or gender and was open for anyone.

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[42] https://sphinx-campus.com/sphinxauth/Account/Login
[43] https://surveyswap.io

The questionnaire was composed of 28 questions, which included inter alia several yes/no questions, 1 data entry question and several 5-point Likert Scale questions. Moreover, the survey contained several single select multiple choice questions at the end constituting the control variables (gender, age, current status, types of game, hours spent on video games, hours spent on 1 specific video game and money spent for microtransactions).

The answer to the first question *(Do you play any video games?)* was essential as it determined the validity of the response. Since our study aimed to establish the relationship between different variables involving microtransactions, respondents indicating that they were not playing video games at all, could not be considered.

Even though it was possible that some of the respondents knew what microtransactions are and maybe even bought some (for their children for example), the fact that they were not involved in video games at all made their responses invalid for our research. Considering that the surveys were mostly shared on gaming related groups however, the risk of getting a high number of invalid responses was low. [44]

Hence, the second question *(What was the last video game you played?)* only appeared when the respondents indicated that they were playing video games. Here, they could indicate the last video game that they played. The name of the game that was then displayed throughout the rest of the survey and constituted the reference variable. The focus on the last game played ensured that we had a constant and perhaps recent memory to which the respondent could refer to. Surely, we thereby encountered the risk of collecting a lot of responses from people that would answer no to both of the following questions of the survey: *Have you ever bought a cosmetic/PTW in-game item in "last video game played"?*

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[44] For example : Facebook groups such as Ingame Luxembourg, Deutsche Gaming Gruppe, Gaming etc. or Subreddits like r/FIFA, r/GTA, r/PES, r/Games, r/Gaming. r/SampleSize, etc.

Nonetheless, the idea was also to see if there is a difference between those that bought at least one type of microtransaction and those that bought none for the last video game they played. We also decided to disguise the PTW items in the survey as unlockables in order to avoid any bias in the responses as the name PTW is often perceived as negative in the gaming community.

The following questions were 5-point Likert Scale questions which all referred to the game that was indicated in the second question *(What was the last video game you played?).* In theory, there are various kinds of rating scales that have been developed to measure attitudes directly (i.e. the person knows their attitude is being studied) and the most widely used for this are Likert Scales (McLeod, 2019). By asking people to respond to a series of statements about a topic, Likert (1932), developed a method that would allow measuring the attitudes or opinions of the respondents on the basis of fixed choice response formats (McLeod, 2019).

These ordinal scales measure the levels of agreement or disagreement and assume that the intensity of the experience is linear and that attitudes can be measured this way. The respondents usually are offered a choice of five, seven or even nine pre-coded responses to several statements, ranging from disagreeing completely to agreeing completely and the neutral point indicating that they neither agree nor disagree. In other words, this Likert point scale allows the individual to express how much they agree or disagree with a statement (McLeod, 2019). Indubitably, like a lot of concepts, Likert Scales have their advantages and disadvantages.

On the plus side, Likert Scales do not expect simple yes/no answers from the respondents, but rather allow for degrees of opinion or no opinion at all. This facilitates the collection of quantitative data that can be analysed with relative ease afterwards (McLeod, 2019).

Like it is the case in a lot of survey types, the validity of a Likert Scale question can perhaps be compromised due to social desirability, meaning that respondents may choose answers that put them in a better light. However, we can assume that this bias was merely existing in our survey due to the nature of the questions.

Additionally, we offered anonymity in order to reduce any kind of social pressure (if existing), thus reducing this potential social desirability bias (Paulhus, 1984).

For our questionnaire, we chose to opt for a slightly modified version of the questions and asked the respondents to rate their experiences based on a 5-point Likert Scale, rather than asking them if they would agree or disagree with a statement. For the fifth question for example, we asked the respondents to indicate how their gaming experience was for the last game they played. The respondents then could indicate on a 5-point scale whether their gaming experience was very disagreeable (far left), neither disagreeable nor enjoyable (neutral) or very enjoyable (far right). The statement on the far left was always the most "negative" one whereas the one on the far right was considered as "positive".[45] The process was the same for all the following Likert Scale questions and intended to measure the variables enlisted in appendix 9.2 Instruments overview.

The choice of the answers, except for Perceived Playability, was mostly based on existing literature adopting similar kinds of research topics. Respondents that indicated not having bought any kind of microtransaction in the last game they played were still asked to indicate how they would perceive them in terms of costs and ease of use.

The survey concluded with several questions establishing the control variables (gender, age, status, weekly hours played for video games in general, yearly spending on microtransactions). These variables are not in the interest of our study's aim but are controlled as they could influence the outcomes of our responses. What's more, they enhance the internal validity of the study by limiting the influence of confounding and other extraneous variables.

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[45] See appendix 9.3 Instruments overview - scale

4.1.3 Methods of analysis

4.1.3.1 Student t-test for mean difference

Before moving to the regression analysis, we start by running t-tests to verify whether we see a significant difference between the means of a dependent variable (here the scale variables) with respect to an independent variable (here CMTX or PTWMTX). Formally, the null hypothesis states that the means for two sub-groups are equal while the alternative hypothesis says that the means are different.

There are two different t-tests: one where the variances are assumed equal (variance homogeneity) or one when it is not the case (variance heterogeneity). To decide which one to select, we run a Levene test. Formally, the null hypothesis states that the variances for two sub-groups are equal while the alternative hypothesis says that the variances are different.

If we can reject the null hypothesis for the t-test this implies that we indeed observe a mean difference. It therefore makes sense to run a regression to better investigate the impact of the independent variables to the dependent variables.

4.1.3.2 Regression analysis

Then, to test our hypotheses, we use a regression analysis, which is a statistical technique that measures the impact of different explanatory variables on a response variable. In this case, the explanatory variables are PTWMTX and CMTX and help us to determine whether the purchase of such an item would affect the different response variables PE, PEU, PP, PCO and BIU.

PTMTX and CMTX are encoded as binary variables, meaning that the respondents either indicated that they bought them in the last game they played (1) or not (0). PE, PEU, PP, PCO and BIU, are encoded on a scale from 1 to 5 by translating the given responses from textual data to numerical data.[46]

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[46] See appendix 9.3 Instruments overview - scale

As we established ten hypotheses, we run the regression analysis ten times in which we always test the impact of the independent variable (PTWMTX and CMTX) on one of our dependent variables (PE, PEU, PCO, PP and BIU). For the regression between PTW and PE for instance, the regression equation is then equal to :

$$PE_i : \beta_0 + \beta_1 \times (PTWMTX_i) + e_i$$

PE_i: Dependent variable (Y_i)

β_0: Population intercept

β_1: Coefficient slope

$PTWMTX_i$: Independent variable (X_i)

e_i: Random error term

This procedure was then repeated for the independent variable CMTX. The program to run the ordinal regression analysis on was SPSS by IBM. The population intercept (β_0) gives us the value of the Perceived Enjoyment assuming all other factors would be equal to 0. The coefficient slope (β_1) measures the impact of the independent variable ($PTWMTX_i$) on PE. Being a binary variable, our independent variable can only be either a 0 (no PTWMTX was bought) or a 1 (PTWMTX was bought). This allows us to make comparisons for the value of PE when a PTWMTX was bought and when it was not bought.

To determine whether our hypotheses are true or not, we have to determine if the coefficient slope is statistically significant or not by taking a look at the p-value. In simple layman's terms, the p-value can be seen as the probability that the null hypothesis is true.

Generally, when hypotheses are tested, the null hypothesis indicates that there is no difference or change between the two tests, with the second test being the so-called alternate hypothesis. The alternate hypothesis states that there is a difference between the 2 tests. Ultimately, the goal is to disprove the null hypothesis.

In our case, the null hypothesis for *"Buying a PTWMTX **negatively impacts the Perceived Enjoyment"*** for instance would therefore be *"Buying a PTWMTX **does not significantly** impact the Perceived Enjoyment"*. Within this example, a p-value of .30 for example would indicate that there is a probability of 30% that there is no real increase or decrease in the PE as a result of the purchase of a PTWMTX. This means that the lower the p-value, the more confident we can be that the alternate hypothesis is true. In this example, a low p-value (e.g. .00) would mean that buying a PTWMTX causes a decrease in the Perceived Enjoyment if the coefficient slope were negative. For Hypothesis number 6 (*Buying a CMTX does not significantly impact the Perceived Playability (PP)*) the null hypothesis would be that buying a CMTX significantly impacts PP.

Usually, for a regression analysis, a rule of thumb indicates that we use a significance level of 5%, meaning that the p-value should not be higher than .05 to support the alternative hypothesis. With a p-value of 5% (or .05) there is only a 5% chance that the results we are seeing would have come up in a random distribution, so we can say with a 95% probability of being correct that the variable is having some effect, assuming our model is specified correctly. For a p-value that is higher than .05, we cannot reject the null hypothesis and thus not support our alternate hypothesis. As a consequence, we therefore hope to find p-values that are all below .05 to support our alternate hypotheses.

We could also take a look at the output of our t-value because it is inextricably linked with the p-value. It measures the size of the difference relative to the variation in our sample data. Put another way, the t-value is simply the calculated difference represented in units of the standard error. The greater the t-value is, the higher the chance is that we can reject the null hypothesis because this means that there is a significant difference. On the contrary, the closer T is to 0, the more likely there isn't a significant difference.

Both the t-value and the p-value can therefore be considered as different ways to quantify the extremeness of our results under the null hypothesis. The larger the absolute value of the t-value, the smaller the p-value, thus the greater the evidence against the null hypothesis. For our analysis, we will primarily focus on the p-value.

Before running the ordinal regression analysis on the program properly, we first had to make sure that at least some assumptions were true. According to Laerd Statistics, a resource we frequently used to get information on the usage of the program, our data needed to "*pass*" at least four assumptions that are required for ordinal regression to give us a valid result.[47] These assumptions were stated as follows and all held true:

1. The dependent variable should be measured at the ordinal level.
2. The independent variables have to be continuous, ordinal or categorical.
3. There is no multicollinearity between the independent variables.[48]
4. Proportionality of odds, meaning that each independent variable has an identical effect at each cumulative split of the ordinal dependent variable

After testing the assumptions, we then ran the regression analysis on SPSS where we analysed inter alia the constant, the slope coefficient and the significance of the coefficient (p-value).

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[47] See https://statistics.laerd.com/spss-tutorials/ordinal-regression-using-spss-statistics.php
[48] As only 1 independent variable (PTWMTX or CMTX) in the regression

4.2 Results of analysis

This section will contain inter alia an analysis of the descriptive analysis where we will describe the control variables, the dependent variables and the independent variables. Then, we will analyse the results provided by the student-t-test and the regression analysis and state whether our hypotheses were confirmed or not.

4.2.1 Sample summary[49]

Initially, we aimed to obtain at least 500 responses. We were able to collect 535 responses (n= 535). Out of these 535 responses, 71 were not considered as they indicated that they were not playing video games at all (13.3%) giving us 464 valid responses (86.7%). The completion rate of the survey was 100%. As already indicated before, the survey was distributed mostly on social media platforms that were related to gaming, in order to ensure that the number of non-players would be held to a minimum. The respondents were predominantly male and aged between 21 and 35 years. The sample contains a high number of people that have neither bought a cosmetic nor a PTW microtransaction. In fact, 46.6% expressed not having bought a MTX in the last game they played.

Furthermore, the most popular type of game that our respondents played were Simulations (19.8%) and Action (16.4%). Concerning the last game they played, most of our respondents indicated they play it around 3-7 hours a week (34.5%). Around 30% even stated that they would play this game for 7 hours up to 18 or more. This means that the majority of our respondents spent more than at least 3 hours on the last game they played. Within this frame of reference, the majority of our respondents indicated that they at least spent 1€ on microtransactions.

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[49] See 9.4 Results of survey (English version) for entire output of survey

4.2.2 Descriptive statistics

4.2.2.1 Control variables

Figure 7 - Gender distribution of sample

What is your gender?
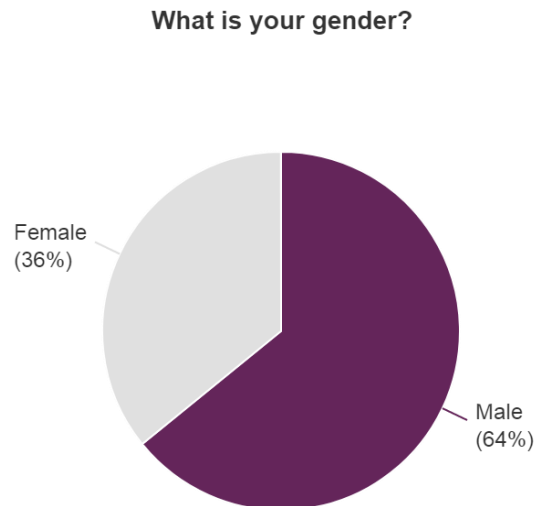
Concerning the gender distribution, the male gender was predominantly present. In fact, 64% of the respondents indicated being male, while 36% indicated being female, meaning that nearly ⅔ of our respondents were male, thus not entirely confirming our secondary data on the broadening of the customer segments.[50] This can be due to several reasons such as the sample size for instance. Our sample was simply not big enough to be compared to the survey conducted by Newzoo as the latter was held in 13 countries all over the world. Second, it may also be that our gender distribution was disproportional due to random chance and that a rerun of our survey would yield different results. Third, statistically speaking there are still more males that play video games, even if we can observe a relative broadening of the gender distribution in the video game industry.

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[50] See Figure 2 - Number of active video gamers worldwide from 2015 to 2023

Figure 8 - Age distribution of sample
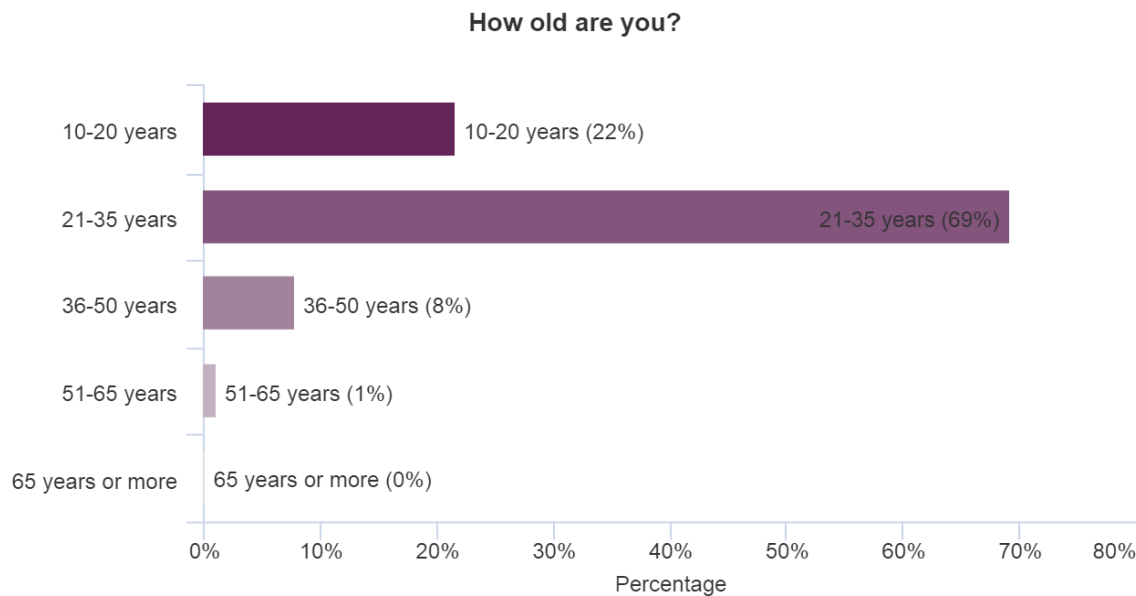
Concerning the age the vast majority of the respondents (69%) indicated being aged between 21-35 years. The second highest frequency was counted for the 10-20 year olds (22%). As for the over 65-year-olds, we collected one single response (0.21%). Compared to the study conducted by Newzoo, we can confirm that the 21- to 35-year-olds seem to be the most present target age even though this tranche is significantly higher for our sample.[51] Once again, the difference in the results can be explained through different arguments:

First, the survey was primarily shared on social media platforms such as Instagram which is mostly used by 18-34 year olds.[52] Same can be assumed for reddit even though no reliable data for this can be retrieved.

Then, our survey was shared on the online exchange portal *surveyswap.io.* Considering that this portal is mostly used by academics to collect data for their research papers, it is reasonable to assume that most of the users who filled out our survey were somewhere in this predominant age category (21-35 years).

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[51] See Figure 2 - Number of active video gamers worldwide from 2015 to 2023
[52]https://www.statista.com/statistics/248769/age-distribution-of-worldwide-instagram-users/,
Distribution of Instagram users worldwide as of January 2021, by age and gender, retrieved on May 11, 2021

Accounting these circumstances and the fact that older people generally play less video games, it may not be surprising that just 7 (1.51%) of our respondents were 51 years or older.

Figure 9 - Status distribution of sample
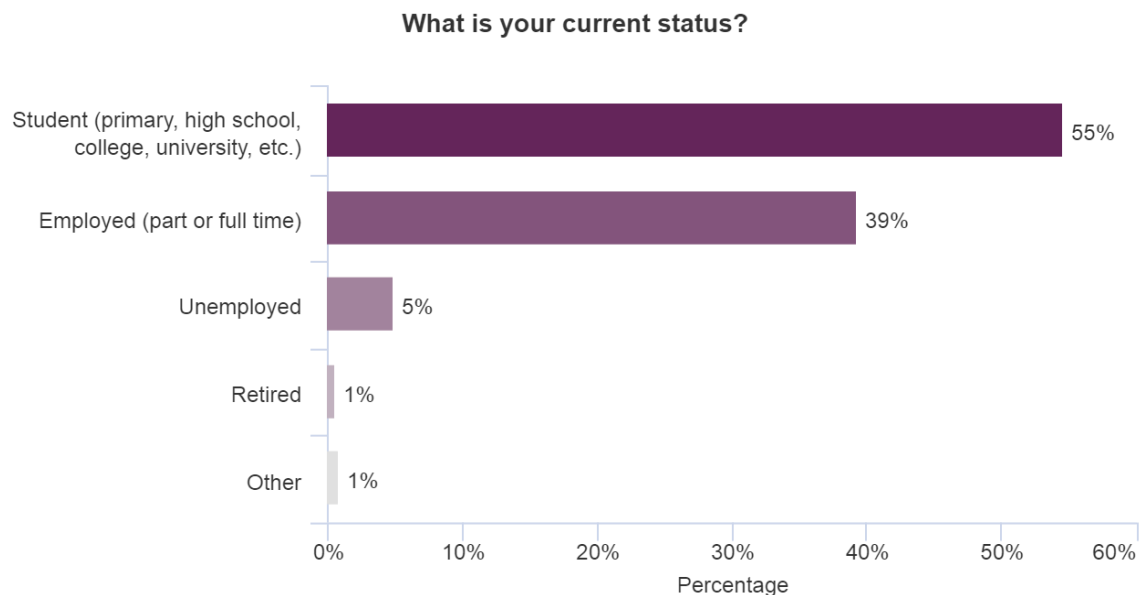
Naturally, this predominance of the younger age categories was also reflected in the responses concerning their current status where 55% of the respondents indicated being students. 39% of the respondents were employed. Only 5% indicated being unemployed while the remaining ones stated being either retired or something else (both 1%).

Figure 10 - Distribution of hours spent playing video games

Around how many hours do you spent playing videogames a week?

Effective responses: 464
Mean: 3.6

Response rate: 100%
Standard deviation: 1.4
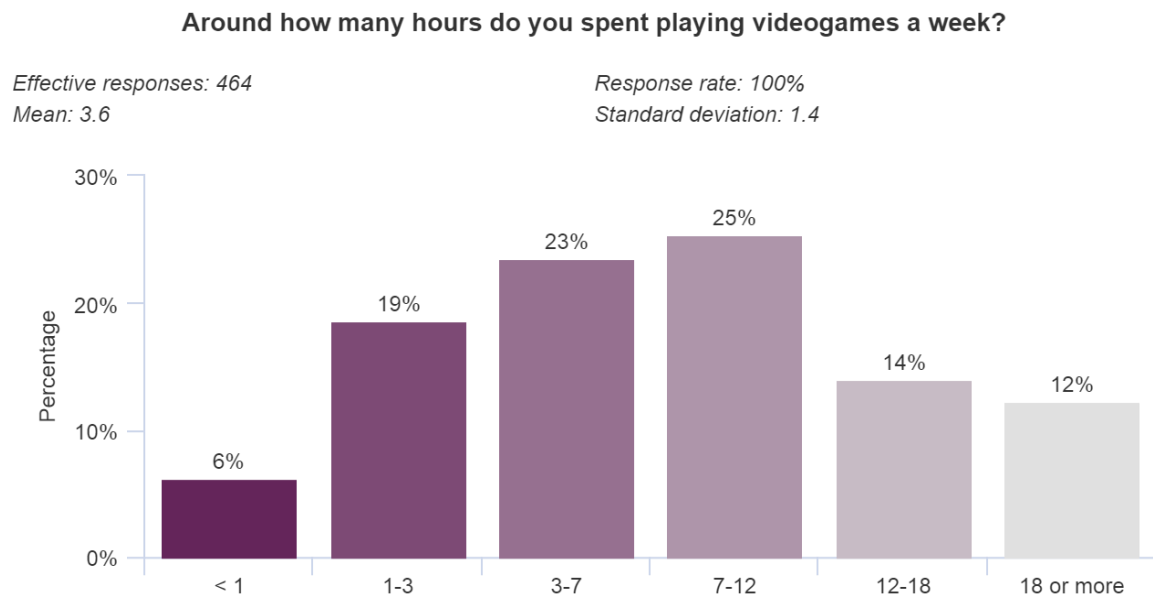
Concerning the play time of video games in general, our distribution seems to be more or less equally distributed with an average of 3.6 and a standard deviation of 1.4. Most of the respondents indicated playing around 7-12 hours a week (25%), closely followed by those that play 3-7 hours a week (23%). 26% indicated playing 12 to 18 hours and even more. Compared to a study published by Statista in January 2021, our sample seems to be identically distributed. [53]

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[53] https://www.statista.com/statistics/261264/time-spent-playing-online-games-worldwide-by-age/, retrieved on May 11, 2021

Figure 11 - Distribution of money spent on microtransactions

In total, around how much do you spend on in-game purchases in a year? (in €)

Effective responses: 535　　　　　　　*Response rate: 100%*
Mean: 2.8　　　　　　　　　　　　　*Standard deviation: 1.7*
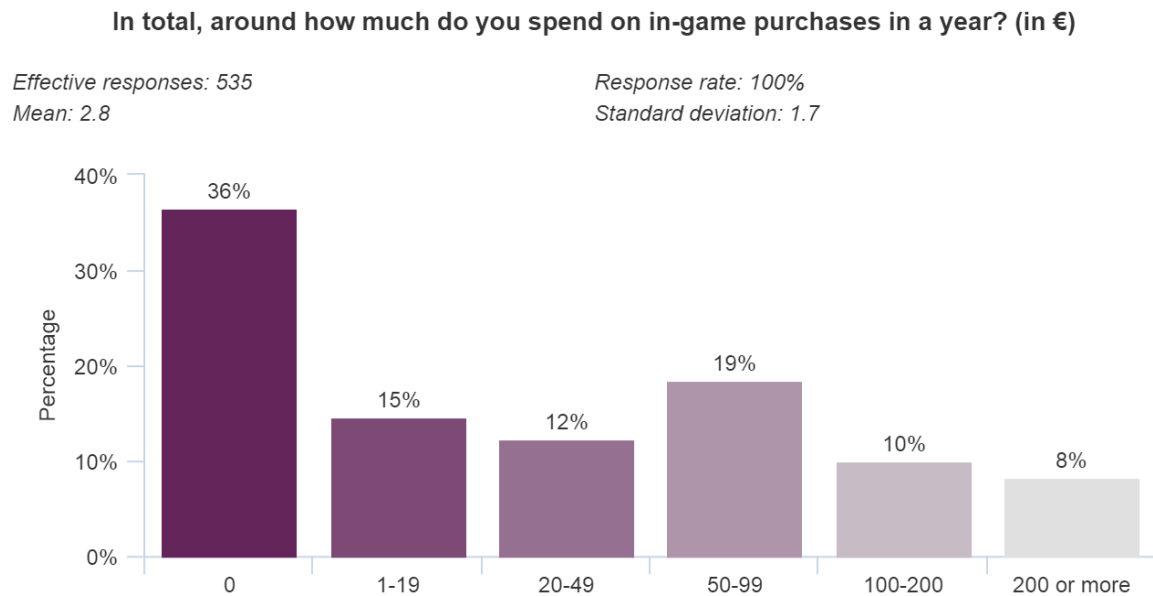
In terms of yearly spending we could not observe any pattern in the responses (mean = 2.8 and std. deviation = 1.7). 64% of our respondents indicated having at least spent 1€ on microtransactions whereas 36% never spent a single euro. Out of the 64% of the spenders, 19% stated that they are spending around 50 to 99 euros whereas 8% declared spending more than 200 euros on microtransactions in a year. Taking into account the increasing exposure of microtransactions in the video game industry, it is not surprising to see that the majority of our respondents indicated that they spent at least some money on in-game purchases.

4.2.3 Independent variables

Figure 12 - Distribution of cosmetic microtransaction buyers
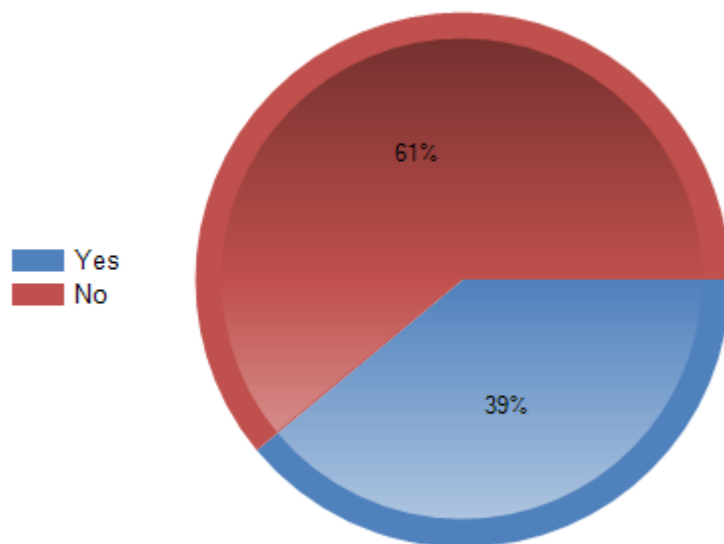
Out of all the respondents that indicated playing video games (n=464), 39% indicated that they bought at least a cosmetic microtransaction in the last video game they played.

Figure 13 - Distribution of PTW microtransaction buyers
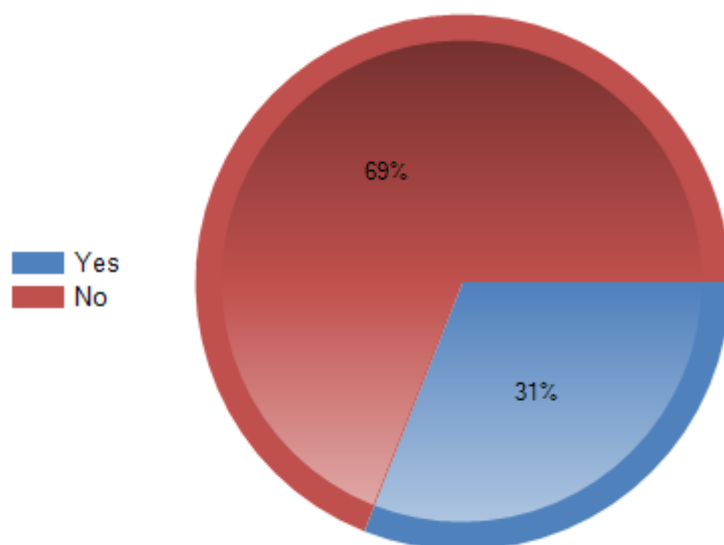
As for the PTW microtransactions, 31% stated having bought one for the last game they played. This shows that there is a slight tendency towards cosmetic microtransactions, even though this distribution can be due to the sample. Nevertheless, this distribution was accounted for as we knew that people would only refer to the last game they played. A lot of our respondents did not buy any type of microtransaction for the last game they played but perhaps did buy some kind of in-game item in the past. This is not necessarily bad as this allows us to compare the difference in the perception between those that bought some type of microtransaction and those that didn't. The fact that we referred to the last game they played allowed us to have a reference for the respondents and be more consistent in the analysis.

4.2.3.1 Cross table analysis of our independent variables

Table 3 - Cross table analysis of independent variables

CMTX → PTWMTX ↓	Yes			No			Total	
	Freq.	% Obs.	Deviation	Freq.	% Obs.	Deviation	Freq.	% Obs.
Yes	74	51,4%	+ VS	70	48,6%	- VS	144	100%
No	107	33,4%	- VS	213	66,6%	+ VS	320	100%
Total	181	39%		283	61%		464	

According to the cross-table analysis, 144 respondents claimed that they bought a PTW microtransaction in the last game they played. Only 70 respondents bought solely a PTWMTX. 181 respondents claimed that they bought a cosmetic microtransaction whereas 107 of them only bought CTMX. 213 bought neither a cosmetic in-game item nor a PTW and 74 respondents bought both types of MTX.

This shows once again that the number of respondents who have not bought a single type of MTX's was very high (45.91%).[54] Out of the 464 valid responses, only 15.95% have bought both types of MTX's in the last game they played.[55]

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[54] 213 / 464

[55] 74 / 464

4.2.3.2 General analysis of our independent variables

Table 4 - PTW & Cosmetic purchases for last game played

	N	Minimum	Maximum	Avg.	Std. Deviation
PTWMTX	464	0	1	.31	.463
CMTX	464	0	1	.39	.488

The independent variables were constituted as binary variables for which the respondents could either indicate that they have bought the respective in-game item (1) or not (0). The means indicate that 31% of the respondents stated having bought a pay-to-win item and 39% declared having bought a cosmetic item in the last game they played. The standard deviations (.463 and .488), which measure the average deviation from the mean, are pretty similar to each other and are hence comparable.

Prior to our data collection, we assumed cosmetic items to be more popular among the gaming community. This seems to be the case here as the respondents bought, on average, more often cosmetic in-game items than PTW ones for the last game they played.

On the contrary, this means that 69% respectively 61% of our respondents did not buy an in-game item. As previously stated, this was a risk that was accounted for when the survey was put together. The answers indicating no in-game item was bought were still relevant for our regression analysis. However, a more even distribution and higher presence of in-game purchases would have been preferred for analysis purposes.

4.2.4 Dependent variables

The dependent variables were constructed on a Likert scale basis that ranged from 1 to 5. The higher the value was, the more "positive" the dimension was perceived (e.g. PE_03 : 1 = very frustrating; 5 = very pleasant). To calculate the mean of the respective variables, we simply aggregated the answers to the variables and computed the arithmetic mean into a single variable. As we have several items that measure a specific dimension, we have decided to use a simple arithmetic average to compute our dimension. Note that this is a commonly used procedure. For example for perceived enjoyment, we obtain the following formula:

$$\text{Perceived Enjoyment (PE)} = \frac{1}{4}(PE_{01} + PE_{02} + PE_{03} + PE_{04})$$

To avoid potential error in our procedure, we computed Cronbach's Alpha (alpha) to verify the reliability of our approach. We will give more detail below.

4.2.4.1 Perceived enjoyment

Table 5 - PE - Statistical overview

	N	Minimum	Maximum	Avg.	Std. Deviation
PE_01	464	1	5	4.16	.933
PE_02	464	1	5	4.03	.907
PE_03	464	1	5	3.89	1.038
PE_04	464	1	5	3.93	.913
PE	464	1.00	5.00	4.00	.801
Valid N	464				
Cronbach's Alpha					.866

As illustrated above, the variable Perceived Enjoyment (PE) was composed out of 4 questions which aimed to measure the perceived enjoyment of the player when playing the last game. Given the means for the respective variables (PE_01, PE_02, etc.) we then computed the arithmetic mean of the variable PE which amounts to 4.00, meaning that the respondents generally enjoyed playing the last video game they played. Cronbach's Alpha (alpha), which is used to test whether multiple question Likert scale surveys are reliable, is equal to .866. In other words, alpha measures the reliability or internal consistency of our survey. By considering the 4 items (PE_1, PE_2, PE_3, PE_4) used for this variable, this value tells us how closely they are related to each other. According to a rule of thumb, we want to have an alpha that is higher than .7, which is the case here (Cortina, 1993).

4.2.4.2 Perceived playability

Table 6 - PP - Statistical overview

	N	Minimum	Maximum	Avg.	Std. Deviation
PP_01	464	1	5	3.15	.981
PP_02	464	1	5	4.09	.844
PP_03	464	1	5	4.02	.937
PP	464	1.00	5.00	3.75	.650
Valid N	464				
Cronbach's Alpha					.499

Here, we immediately can observe that alpha has a relatively low value (.499), meaning that our survey questions regarding this variable are not very reliable and don't measure the same dimension.

The mean of 3.75, indicating that the players generally had a rather good perception of the playability of the last game they played, is therefore not usable. This is due to the nature of the questions which were mainly based on different papers measuring different perceptual aspects of a game. Correspondingly, we cannot run a regression analysis.

4.2.4.3 Perceived ease of use

Table 7 - PEU - Statistical overview

	N	Minimum	Maximum	Avg.	Std. Deviation
PEU_01	464	1	5	4.20	.897
PEU_02	464	1	5	4.01	.954
PEU_03	464	1	5	4.23	.929
PEU	464	1.00	5.00	4.15	.807
Valid N	464				
Cronbach's Alpha					.822

The Perceived Ease of Use (PEU), which indicates how easy the use of microtransactions for the last game played were perceived, gives us an arithmetic mean of 4.146.[56] This indicates that the process of buying and using microtransactions is perceived as rather easy and effortless by our respondents.

As MTX continue to gain popularity amongst the video game developers, it is no surprise that the implemented processes for buying them are made as user friendly and uncomplicated as possible. With an alpha of 0.822, we can say that our questions were adequately measuring the same dimension.

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[56] Respondents that did not buy an microtransaction in the last game that they played still had to answer how they perceived the ease of use of microtransactions in general.

[66]

4.2.4.4 Perceived costs

Table 8 - PCO - Statistical overview

	N	Minimum	Maximum	Avg.	Std. Deviation
PCO_01	464	1	5	2.81	1.057
PCO_02	464	1	5	2.96	1.114
PCO_03	464	1	5	2.98	1.063
PCO	464	1.00	5.00	2.92	.976
Valid N	464				
Cronbach's Alpha					.890

The perceived costs, which measured the extent to which MTX, both PTW and cosmetic, were perceived price wise, gave us a mean of 2.92 with a standard deviation of .976. This means that the respondents had rather mixed opinions and felt rather neutral about this topic.

Taking a look at the distribution of the responses, the answers seem to be more or less evenly split. For the first question *"In terms of price, in-game items are…"* for instance, 38% of the respondents stated that they perceive them as rather expensive or very expensive whereas 26% perceived them as rather cheap or very cheap.

Regarding the 2 other dimensions, the responses are split more evenly: 29% found that the prices of in-game items are rather bothersome or very bothersome and 27% claimed that the prices are rather not troubling or not troubling at all.

Considering the reasonableness of the prices, the distribution was also very even (35% indicating that the prices are rather unjustified or totally unjustified and 31% saying that they are rather reasonable or very reasonable). This neutrality in the responses is difficult to explain and may be related to many other factors such as the price sensitivity and personal situation of the respondent for instance.

We could assume that a respondent who is employed has a very different price sensitivity concerning microtransactions than a student for example. Here, the alpha of .890 can be considered as very good.

4.2.4.5 Behavioural intention to use

Table 9 - BIU - Statistical overview

	N	Minimum	Maximum	Avg.	Std. Deviation
BIU_01	464	1	5	3.34	.911
BIU_02	464	1	5	3.68	.978
BIU_03	464	1	5	3.59	.966
BIU	464	1.00	5.00	3.53	.856
Valid N	464				
Cronbach's Alpha					.882

The last dependent variable, the Behavioural Intention to Use has an aggregated mean value of 3.53 with a standard deviation of .856, meaning that the respondents have a slight tendency to replay the last game they played again. The reliability of our questions is approved and measures the same dimensions as a Cronbach's alpha of .882 is seen as good.

4.2.5 T-test and regression analysis

4.2.5.1 Student t-test for mean difference – PTWMTX

Table 10 - T-test - PTWMTX[57]

PTWMTX		Levene's Test of Equality for Variances		T-test for equality of means	
		F	Sig.	Sig. (2-tailed)	Mean difference
PE	Equal variances assumed	34.28	.000	.000	.647
	Equal variances not assumed			.000	.647
PP	Not subjected to analysis due to low Cronbach's Alpha				
PEU	Equal variances assumed	18.79	.000	.000	-.319
	Equal variances not assumed			.000	-.319
BIU	Equal variances assumed	9.51	.000	.000	.403
	Equal variances not assumed			.000	.403
PCO	Equal variances assumed	.17	.679	.035	.207
	Equal variances not assumed			.030	.207

We started by verifying whether we could see the mean difference for our scale variables with respect to PTWMTX.

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[57] See appendix 9.5 Independent Samples Test for detail

For PE for instance, the Levene's test indicated that there is a variance heterogeneity because the p-value is zero. This implies that we can reject the null hypothesis of equal variance. We therefore check the p-value of the t-test in the row called "*Equal variances not assumed*".

The p-value of the t-test is .000 meaning that we indeed have mean difference for PE. The mean difference is positive (.647) indicating that the sub-groups that have not purchased a PTWMTX have a higher PE on average than those who did. In other words, the purchase of a PTWMTX decreases the PE of the last game.[58]

For Perceived Ease of use, the Levene's test implies that there is variance heterogeneity too. The p-value is .000 so that we can reject the null hypothesis of equal variance. We hence check again the p-value of the t-test in the row called "*Equal variances not assumed*". The p-value of the t-test is also equal to .000 meaning that we have a mean difference (-.319) for PEU too. Put in another way, individuals that have bought a PTWMTX, perceive their use and effort as lower as those that did not.[59]

Concerning the variable BIU, we observe variance heterogeneity as well with a p-value of .000 for Levene's test and a p-value of .000 for the t-test. The mean difference of .403 signifies that individuals who purchased a PTWMTX in the last game they played have a lower BIU than those who didn't. Expressed differently, buying a PTWMTX decreases the BIU for the last game played.

As for PCO, the Levene test indicated that there is no variance heterogeneity which means that we cannot reject the null hypothesis of equal variance. This means that we check the row "*Equal variances assumed*" where the p-value is equal to .035, which implies that we still have a mean difference. Simply put, buying a PTWMTX decreases the value of PCO. The lower the PCO, the more expensive PTWMTX is perceived.

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[58] Reminder: The higher a score is the "better" it is. The purchase of a PTW decreases the PE, meaning that the player enjoyed the game less.
[59] Put yet in another way: Buying a PTWMTX increases the value of PEU. The higher PEU is, the easier and less effortless the use of a PTWMTX is perceived

Table 11 - T-test - CMTX[60]

CMTX		Levene's Test of Equality for Variances		T-test for equality of means	
		F	Sig.	Sig. (2-tailed)	Mean difference
PE	Equal variances assumed	7.36	.007	.146	-.111
	Equal variances not assumed			.128	-.111
PP	Not subjected to analysis due to low Cronbach's Alpha				
PEU	Equal variances assumed	30.76	.000	.000	-.425
	Equal variances not assumed			.000	-.425
BIU	Equal variances assumed	10.01	.002	.000	-.294
	Equal variances not assumed			.000	-.294
PCO	Equal variances assumed	.02	.869	.028	-.204
	Equal variances not assumed			.027	.-.204

Here, the procedure was the same as for the PTWMTX; we checked whether we would have a mean difference for our scale variables with respect to CMTX. For PE, Levene's test implies that we have variance heterogeneity due to the p-value of .007.

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[60] See appendix 9.5 Independent Samples Test for detail

We can therefore reject the null hypothesis of equal variances. However, observing the p-value of our t-test, we see that the p-value is .128 which is above the threshold of .05. This means that we have no mean difference for PE. Ergo, there is no difference in the PE between a CTMX buyer and a non CMTX buyer.

For PEU, the interpretation is the same as for PTWMTX; Levene's test indicates that we have a variance heterogeneity (p-value .000), allowing us to reject the null hypothesis of equal variances assumed. The mean difference of -.425, which is statistically significant given its p-value of .000, indicates that buying a CMTX decreases the value of PEU. This means that someone who buys CMTX perceives its usage as easier as someone who doesn't.

For BIU, we have variance heterogeneity as well (p-value .002), meaning that we reject the null hypothesis of equal variances assumed. The mean difference of -.294 (p-value: .000) stipulates that the BIU of a CTMX buyer is higher than the one from a non-buyer. This means, someone who has bought a CTMX is more likely to replay the game than someone who hasn't.

For PCO, we have no variance heterogeneity as the p-value is above .05 (.869). We therefore cannot reject the null hypothesis of equal variances assumed. The mean difference of -.204 is significant (p-value: .028) meaning that the purchase of a CTMX decreases the value of PCO. Stated another way, individuals that have bought a CTMX perceive their costs as lower than those that didn't.

4.2.5.2 Regression analysis

After measuring the different relationships we wanted to measure the impact of the independent variable on the dependent variable. We therefore conducted a regression analysis. The results of the regression then allowed us to confirm whether our stated hypothesis held true or not. The results are summarized in the following table and a further description is provided subsequently:

Table 12 - Output regression analysis - Overview[61]

Hypothesis	Population intercept β_0	Coefficient slope β_1	p-value β_1	t-stat.	Alternative Hypothesis
(1) Buying a PTWMTX negatively impacts Perceived Enjoyment (PE)	4.201	-.647	.000	-8.664	Supported
(2) Buying a PTWMTX negatively impacts the Behavioural Intention to Use (BIU)	3.663	-.403	.000	-4.803	Supported
(3) Buying a CMTX positively impacts Perceived Enjoyment (PE)	3.957	.111	.146	1.457	Not supported
(4) Buying a CMTX positively impacts the Behavioural Intention to Use (BIU)	3.423	.294	.000	3.649	Supported
(5) Buying a PTWMTX negatively impacts Perceived Playability (PP)	Not verifiable as Cronbach's Alpha too low				
(6) Buying a CMTX does not significantly impact Perceived Playability (PP)	Not verifiable as Cronbach's Alpha too low				
(7) Buying a CMTX positively impacts the Perceived Ease of Use (PEU)	3.980	.425	.000	5.810	Supported
(8) Buying a PTWMTX positively impacts the Perceived Ease of Use (PEU)	4.047	.319	.000	4.060	Supported
(9) Buying a CMTX positively impacts the Perceived Costs (PCO)	2.839	.204	0.028	2.203	Supported
(10) Buying a PTWMTX negatively impacts the Perceived Costs (PCO)	2.982	-.207	0.035	-2.120	Supported

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[61] See appendix 9.6 Regression output for detail.

As presented by our overview, 7 out 10 of our alternative hypotheses can be supported due to the significance of the slope coefficient (p-values β_1 <.05). Hypothesis number 3 cannot be supported as the p-value is .146. As for Hypotheses number 5 and 6, we could not run a regression analysis as Cronbach's Alpha was too low.

For our analysis, we will first take a look at the hypotheses concerning the purchase of PTW microtransactions and interpret our results (1, 2, 8, 10) before passing to the cosmetic microtransactions (3, 4, 7, 9). Hypotheses 5 and 6 will not be interpreted as we did not run a regression analysis. In the next section, we will compare our results and discuss the observations we made when comparing those 2 types of microtransactions.

PTWMTX

(1) Buying a PTWMTX negatively impacts Perceived Enjoyment (PE)

With a coefficient slope of -.647 that is statistically significant (p-value: .000) we can state that our hypothesis can be supported. The coefficient slope tells us that on average, an individual that has bought a PTW type of microtransaction, will have a lower PE of .647 than someone who has not bought a PTW microtransaction. In other words, according to our regression, someone who buys an PTW microtransaction enjoys a game less than someone who doesn't buy one by .647.

(2) Buying a PTWMTX negatively impacts the Behavioural Intention to Use (BIU)

We found a statistically significant slope coefficient of -.403, telling us that, on average, the BIU of an individual who bought a PTW in-game item decreases by .403 compared to someone who does not purchase a PTW in-game item. As the coefficient slope is significant (p-value: .000), our hypothesis therefore holds true.

(8) Buying a PTWMTX positively impacts the Perceived Ease of Use (PEU)

The p-value of .000 and coefficient slope of .319 indicate that this hypothesis is also supported and that there is a positive impact on the PEU when a PTW microtransaction was concluded. This means that, on average, someone who bought a PTW microtransaction perceived its use as easier than someone who didn't.

(10) Buying a PTWMTX negatively impacts the Perceived Costs (PCO)

Here, the coefficient slope of -.207 can also be interpreted as it's p-value indicates that it's statistically significant. (p-value: .035) Our hypothesis therefore holds true. This coefficient implies that, on average, an individual, who buys a PTW microtransaction perceives the costs as lower than someone who doesn't buy one.

CMTX

(3) Buying a CMTX positively impacts Perceived Enjoyment (PE)

In this case, our alternative hypothesis cannot be supported. The p-value of .146 and t-stat of 1.457 indicate that buying a cosmetic microtransactions has no significant impact on the Perceived Enjoyment.

(4) Buying a CMTX positively impacts the Behavioural Intention to Use (BIU)

A coefficient slope of .294 that is statistically significant (p-value: .000) indicates that our alternative hypothesis can be supported. On average, respondents that bought a cosmetic microtransaction in the last game they played, enjoyed their gaming experience more than those that did not buy one, indicating that the purchase of a CTMX has a positive impact of .294 on the value of Perceived Enjoyment.

(7) Buying a CMTX positively impacts the Perceived Ease of Use (PEU)

Once again, we can support our alternative hypothesis as we computed a coefficient slope of .425 that is statistically significant (p-value: .000). This means that on average, a CTMX buyer perceived the usage of cosmetic microtransactions easier than someone who didn't buy one in the last game they played.

(9) Buying a CMTX positively impacts the Perceived Costs (PCO)

A significant coefficient slope of .204 (p-value: .028) indicates that we can support our alternative hypothesis again. An individual who bought a cosmetic microtransaction, perceives its costs, on average, higher than someone who did not buy CMTX.

5. Discussion and implications of the results

5.1 Discussion

As already hinted in our secondary research, our analysis was able to confirm the impression that CMTX seem to be more popular than PTWMTX. In fact, we found opposing relationships between CMTX and PTWMTX for certain aspects of a video game experience. For instance, players who purchased cosmetic in-game items indicated being more likely to return to the last game they played as opposed to PTWMTX purchasers. Latter tended to indicate that they are less likely replay the last game they played compared to non PTWMTX purchasers. This is also true considering the PE of PTWMTX buyers, who enjoyed the last game they played less than the non - PTWMTX buyers. An inverted relationship to CMTX could not be observed as our p-value for the coefficient slope for PE was not significant. However, it looks like CMTX are perceived as more positive than PTWMTX. We don't have any specific reason as to why this is the case, but we can make some assumptions based on our secondary research and analysis we conducted.

Cosmetic microtransactions personalize the gaming experience immensely as they allow to customize a lot of aspects in the game (e.g. avatar, weapons, skins, menus). This degree of personalization and the absence of altercation on the gameplay could be perceived as welcomed by players. This could explain why the respondents who bought a CMTX tend to replay a game more often.

PTWMTX on the other hand, seem to suffer from their unpopularity in the gaming community. Intuitively, one could argue that players who spend money on items to win have a higher enjoyment because their chances of winning are increased. However, it must be said that the name pay-to-win can be misleading, since the purchase of such an item does not automatically lead to winning a game or succeeding at a task.

Unlocking new levels that are behind a paywall, for example, can also be accompanied by disappointment if the game experience does not meet the expectations. The same goes for PTWMTX in games where a player can buy advantages (like boosts that make your avatar stronger). Buying a PTW system increases the chances of winning immensely but does not automatically mean that the player will win and come out on top. This could have an impact on the enjoyment of the player who is then disappointed that the spent money, which had the purpose of leading him to victory, does not meet its target.

Furthermore, the negative impact of PTW systems on the Perceived Enjoyment could be explained by the arguments given by Evers et. al (2015), who found out that players respond negatively to other players who buy functional benefits in games. This could have an overall negative impact on the perception of PTW systems. Milner's (2013) argument that the integrity of the game is being sacrificed when the developer emphasizes PTW microtransactions sounds reasonable as well and emphasizes once more that PTWMTX are not very popular amongst the players.

We also suspect that many players play on a casual basis and simply aim to enjoy their playtime. Essentially, video games are of a hedonic nature, even though the competitive aspect has increased in the recent years. However, when establishing our BMC, we found out that there are more needs that are fulfilled while playing video games like control for instance. The players seek to enjoy their gaming experience and to ultimately be in control of the situation. Not being able to access various aspects of a game or being disadvantaged because they have to spend extra money on a game (for which they often already have paid the full price) seems to negatively influence the gaming experience. The social utility functions of a game evoked by King & Delfabbro (2009) could play a role too as the competitional aspect is affected too.

Concerning the negative impact of PTWMTX on the BIU, it is not surprising to see that the relationship is negative as well as Perceived Enjoyment is a strong predictor for the BIU (van der Heijden, 2004). In this case, a negative impact from PTWMTX on PE was most likely to result in a negative impact from PTWMTX on BIU.

Cosmetic microtransactions, which we consider as more favoured by the players, are perceived as cheaper when they are bought in contrast to PTW microtransactions who alter the price perception negatively. This difference could be explained by the popularity of the items as we could argue that individuals seem to perceive the more popular option as less cheap when they effectively buy them. Respondents that indicated buying a PTWMTX perhaps perceive them as more expensive when they are bought due to their rather unpopular stance and the reasons we mentioned before (paywall, lack of control etc.).

In terms of PEU, both types of microtransactions are positively influenced by a purchase. The fact that both of their relationships are identical and perceived as same is not surprising because there is no difference in the buying process for either one of them. The positive implication on PEU by buying a microtransaction could be in our case explained by the recency of the purchase. As we asked the respondents to indicate if they bought a cosmetic or PTW microtransaction in the last game they played, the ones that indicated having done so, could have had a more recent memory of the buying process. They therefore may have perceived the ease of use as easier and less effortless than those that did not buy a type of MTX for the last game they played.

As for the Perceived Playability, no assumptions or observations can be made because the questions were not measuring the same dimensions, resulting in an alpha score that was unacceptable.

Naturally, these are all just assumptions made in the context of our exploratory research and further analysis in the form of a qualitative survey is needed to establish the reasons for the difference in the perception of these 2 types of microtransactions.

5.2 Implication for developers

Regarding cosmetic microtransactions, video game developers are able to seize an interesting market opportunity due to the nature of the product. The inherent personalization factor allows the developers to create unique offers that can be catered accordingly to the wishes of their customer bases. By using social media for instance, developers can communicate with their customers in a much more efficient and direct manner and collect feedback and reactions almost instantly. This permits the developers to analyse and pick-up the newest trends in the gaming community which then can be implemented in the marketing strategies of their in-game content.

Thus, developers are able to create content that their customers can use to personalize their gaming experience. As a consequence of this type of co-creation, the users feel much more immersed and listened to as they are able to design some aspects of the game according to their preferences. As we established in our BMC, customer relationships in the video game industry are characterized by the loyalty of their customer base which is truly passionate about its products and brands. Involving the customers by giving them the choice to vote on the next skin that a game could implement for example would only strengthen this loyalty, ultimately generating more revenue for the game developers. Trough the indirect network effects, the hardware developers could profit too. [62]

Some video game developers and publishers already took advantage of this and launched marketing campaigns accordingly. In the game Rocket League for example, the developers created a partnership with the NFL, which allowed players to design their cars to match their favourite NFL teams (e.g. use of logo, banner, colours). In the game Fortnite for instance, Epic Games teamed up with Marvel and allowed players to model their avatars after the heroes featured in the movies (e.g. Iron Man, Thor). Through clever marketing and collaboration with already very famous and popular franchises (like Marvel, NFL, F1, NBA, etc.), developers are not bound to many limits in terms of personalization and can profit from the integration of other huge fan bases to boost the popularity of their games.

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[62] See 1.3.1 Key Partners for explanation of indirect network effects

This in turn increases their target segments and offers new ways of generating new business. Of course, smaller development companies may not have the required financial resources to establish such partnerships. Nonetheless, including their customer base interactively by adding in-game items that are requested from the fan base could potentially increase the popularity of the game.

PTW microtransactions, on the other hand, do not seem to be very popular, at least according to our results and secondary research. The possible reasons have been discussed previously. Adding to this the recent scandals surrounding PTW mechanisms, an excessive focus on this model seems to be the wrong approach. To avoid backlash, we hence recommend video game developers, especially those that are strongly relying on the freemium monetization models, to focus on a broader implementation of cosmetic microtransactions and to not overuse PTW systems.

In terms of user friendliness, we can say that the developers are doing very well and seem to have established payment and usage systems that are understood and accepted by the players. For the perceived costs, the opinions vary a lot and can also be due to the price sensitivity. Here developers have to tailor their MTX offerings to their main customer base.

6. Limits and potential improvements

Regarding our methodology approach and results, several limits and improvement suggestions apply. First of all, research about the video game industry is pretty scarce and especially in the field of microtransaction not a lot of literature can be found in order to formulate a lot of grounded hypotheses. Even though there are some research papers concerning microtransactions (Evers et al., 2015; Milner, 2013; Zendle et al., 2020), no specific research has been done analysing the difference in the perception of different types of microtransactions. This lack of research material is especially reflected in the formulation of the hypotheses concerning the Perceived Playability (PP) where our alpha has been very low. The idea was to measure if the perceived playability of a game was really influenced by the purchase of an in-game item. Thence, the questions were focused on 3 important aspects : difficulty, responsiveness and the playability. It was difficult to define the questions regarding this dimension as no research paper is focused on this aspect specifically. Retrospectively, it would have been better to develop 3 variables for each one of the categories and see if the perceived difficulty, responsiveness and playability are influenced by an in-game purchase. Here, we should've tried to include more items in order to increase the alpha score or find questions that measure the same dimension.

Secondly, the presence of an SEM would have been great to model the relations between the different variables and to really illustrate their interconnectivity. Especially in concordance with the TAM, a Structural Equation Model would have been an essential addition. Yet, the implementation of such a model would have required more preparation time and simply surpassed our capacities in terms of implementation.

Thirdly, our sample was not very big by research standards. We were highly engaged to collect as many responses as possible throughout the distribution phase by sharing the survey on a daily basis on different social media platforms like Instagram, Facebook and Reddit. What's more, we filled out hundreds of different surveys on surveyswap.io to collect enough credits.

These credits constituted our balance which allowed other users to fill out our survey. As time went on, the participation percentage decreased gradually and we struggled to collect responses. After a while, we decided to close down the collection of the responses to focus on the analysis of the results. Be that as it may, it would have been favourable to collect more than a thousand responses in order to increase the reliability of our analysis.

Fourthly, our sample was not heterogeneous. Most of our respondents were male, aged between 21-35 and were either employed or at school. When collecting quantitative data, it is generally better to have a sample that is not too homogenous. For our analysis, the majority of our findings are related to this limited sample group and it is difficult to determine whether the same can be said for female gamers for instance. Here, we could have distributed the survey more precisely and try to target different demographic groups. By sharing the survey mostly on gaming related platforms, we did not consider the possibility of encountering a largely male dominant sample.

Fifthly, the number of people that have not bought any kind of microtransaction in the last game they played was relatively high. Even if we included this in our regression, it would have been better to have a more heterogeneous distribution here as well. To achieve this, we should have perhaps elaborated our survey differently and aim to formulate a question where the probability of getting a microtransaction buyer was higher.

Lastly, we used SPSS to run some very basic regressions. This program allows us to run these types of regressions without much trouble, yet the use of more advanced statistical tools would have been beneficial as well. This includes the already mentioned SEM or a Principal Analysis Component (PCA), which is essentially a tool that allows to reduce the number of variables in a data set, while preserving as much information as possible. Due to time restriction, this was unfortunately not possible.

7. Conclusion

The purpose of this master thesis was dual: First, we aimed to draw some attention to a rather under-researched topic and tried to provide some deeper insights into this rising industry that, in our opinion, deserves more academic attention.

Based on our secondary research we were able to conclude that the video game market has been on the rise for years and that its growth potential is enormous. Not being negatively affected by the pandemic situation, the video game industry has nearly doubled in size in the last years and experts estimate the market to grow considerably in the future (expected CAGR's reach from 9 to 12%). This growth transposes parallelly to the industry of eSports and microtransactions which are now multimillion dollar industries themselves.

To provide more insight to this industry, we then drafted a business model canvas which could be used as a reference for future academic research on this topic. Here, we established some of the most important elements of the industry and provided answers on the 9 different elements disclosed in a BMC.

First, we talked about the key partners of the video game industry where we found out that the video game industry is particularly affected by indirect network effects between the consumers, content- and platform providers.

Second, in context of the key activities, we elaborated the 3 main monetization models that we encounter in the video game industry: Premium, freemium and hybrid models. We determined that the developers core tasks are nearly identical but differ in importance. Premium model-based game developers focus more on the game development for instance while developers that focus more on freemium or hybrid monetization models give more importance to customer retention and external relationship management. These monetization models also constitute the main revenue streams for the video game industry.

Third, when talking about key resources, we described the most important assets to make the business model work. Here, we ascertained that this knowledge-intensive industry heavily relies on the expertise and competency of its employees to create value. Financial resources are important too as they constitute the gateway to hire the right people whereas physical resources are deemed as the least essential assets.

Fourth, the analysis of the value proposition resulted in finding out that games go beyond the fulfilment of hedonic pleasure by giving the players a sense of self-empowerment, fulfilment, control, immersion, social utility and identity creation for instance.

Fifth, we observed that the customer relationship management in this industry is heavily marked by a loyal customer base that truly cares about their games and products and is being involved a lot in the creation process through co-creation.

Sixth, we saw that the 2 main used channels are traditional and social media where both of them are being used to fuel the buzz in form of ads and teasers for instance.

Seventh, we observed a broadening of the customer segments where we have a higher proportion of younger people (10-35 years) with a slight tendency towards male gamers.

Eight, we disclosed the cost structure that can be very high depending on the type of game and can therefore reach from several hundreds of dollars to hundreds of millions.

The second goal of this thesis was to find an answer to our research question which focused on the impact of microtransactions on the video game experience for the players. More specifically, we tried to find out whether the type of the microtransaction has an impact on different variables such as the Perceived Enjoyment, Perceived Playability, Perceived Ease of Use, Perceived Costs and Behavioural Intention to use.

Furthermore, we wanted to analyse how microtransactions are perceived in general terms of usage and price and whether the purchase of an microtransaction would affect these variables.

Based on our Student-t-test, where we were able to measure the relationship between the variables, and our regression analysis where we measured the impact of this relationship, we made some interesting observations:

For Perceived Enjoyment, we found out that purchasing a PTW in-game item significantly decreases the Perceived Enjoyment of a player. As for the cosmetic in-game items, we were not able to confirm our hypothesis suggesting that its purchase would increase PE.

For Perceived Playability, we had a low alpha score that indicated that our questions were not measuring the same dimensions. Consequently, we were not able to analyse PP.

For Perceived Ease of Use, our regression analysis indicated that buying a CMTX or PMTX significantly affects the PEU in a positive manner. We also found out that microtransactions are generally perceived as rather easy to use.

For Perceived Costs, our analysis showed that our assumption held true and that buying a cosmetic microtransaction significantly affects the PCO in a positive way while buying a PTWMTX affects the PCO negatively. In terms of general price perception, the opinions were mitigated.

For BIU, as hypothesized, we found that buying a CMTX positively influences the BIU of a player and buying a PMTX would do the opposite.

We aimed to find some explanations on where this divergence in the perception comes from but it is clear that qualitative research is needed to better understand the reasons. Our research was primarily exploratory and allowed us to elucidate the importance of this academically neglected industry and to illustrate the existing perceptual difference of CTMX and PTWMTX.

Based on our findings concerning the microtransactions, we suggested that video game developers should consider concentrating their efforts on cosmetic microtransactions by including their customer base intensely. For PTW in-game systems, we prosed to not overuse them due to the potential backlash from the player base and media.

All in all, we hope that this exploratory work can be used as some kind of a reference point in the literature concerning the video game industry and microtransactions and that the topics mentioned in it will encourage future academics to further explore this ever-growing industry. In the end, it is like Egenfeldt-Nielsen et al. (2019) said : *"Game studies are a young field, one that has yet to settle, systematically and convincingly, some rather important questions. (...) At present, video game studies may have more questions than answers, more doubts than certainties. The rules are still being formed; the orthodoxies have not yet been established. And for the curious researcher, there are many worlds in need of exploration. Of course, this is part of why the field is so thrilling. (...) The discipline welcomes you; **there is much to be done**."*

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9. Appendix

9.1 BMC of video game industry

(see next 2 pages)

Business Model Canvas

Key Partners

- Content providers
- Platform providers
- Market characterized by indirect network effects which connects both content and platform providers
- Entertainment industry
- Recommender system

Key Activities

-Game development
- Creation, production, distribution, internal communication, etc.
- Selling of games
- Intra-industry networking
  - User acquisition
  - Customer retention
  - Relationship management
  - Community management
  - Business relationship management
- Marketing
- Quality Improvement
- Staff management
- Activities differ according to monetization model
- Etc.

Key Resources

- No significant differentiation between informational (industry and technology related) and human resources (developers, programmers, designers, etc.), as both are seen as significant and interconnected
- Financial resources important means to acquire other resources, especially for human resources
- Resources related to external relationships and networking
- Physical resources rather unimportant as easily accessible

Value Propositions

- Hedonic value
- Empowerment
- Recognition
- Control
- Immersion
- Social values
- Social networks
- Communities
  - Identity creation
  - Social responsibilit

Customer Relationships

- Loyal communities
- Co-creation

Channels

-- Traditional media
  - Television, radio, newspapers and magazines

- Social media
  - Twitter, Facebook, Reddit, etc.

Customer Segments

- Diversified market including nearly all age (10-65 years) and gender (M/F) groups with slight focus on :
  - 21 - 50 years, M/F

Cost Structure

Fix costs
- Salaries of development team (Game designers,programmers, graphics & animation teams, etc)
- Software
- Software Licences
- Intellectual Property
- Data
- Equipment
- Etc.
- Variable costs
- Marketing
- Distribution
- Royalties
- Etc.

Revenue Streams

- Fixed pricing model
  - Listed price allowing unlimited access to gameplay
- Subscription fees
  - Monthly subscription fees giving access to online gameplay
- Hybrid model
  - Listed price with possibility to pay subscription fees for online gameplay
- Freemium pricing model
  - Free access to online games in which revenue is generated trough in-game advertisements and sales

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9.2 Instruments overview

Perceived enjoyment, Alpha = .866

- Disagreeable - Enjoyable
- Dull - Fun
- Frustrating - Pleasant
- Boring - Interesting

Perceived Ease of Use, **Alpha = .822**

- Difficult - Easy
- Requires a lot of effort - Requires no effort
- Complicated - Straightforward

Perceived Playability, Alpha = .499

- Hard - Easy
- Bad - Good
- Laggy - Responsive

Perceived Costs, Alpha = .890

- Expensive - Cheap
- Unjustified - Reasonable
- Bothersome - Not troubling

Behavioral Intention to Use, Alpha = .882

- Much less - A lot more
- Very uninterested - Very interested
- Very unmotivated - Very motivated

9.3 Instruments overview - scale

Variable	Description	Text value	Numerical value
PTWMTX	Purchase of a Pay-To-Win microtransaction	yes	1
		no	0
CMTX	Purchase of a Cosmetic microtransaction	yes	1
		no	0
PE_01	Perceived Enjoyment 1	very disagreeable	1
		rather disagreeable	2
		neither disagreeable nor enjoyable	3
		rather enjoyable	4
		very enjoyable	5
PE_02	Perceived Enjoyment 2	very dull	1
		rather dull	2
		neither dull nor fun	3
		rather fun	4
		very fun	5
PE_03	Perceived Enjoyment 3	very frustrating	1
		rather frustrating	2
		neither frustrating nor pleasant	3
		rather pleasant	4
		very pleasant	5
PE_04	Perceived Enjoyment 4	very boring	1
		rather boring	2
		neither boring nor interesting	3
		rather interesting	4
		very interesting	5
PP_01	Perceived Playability 1	very hard	1
		rather hard	2
		neither hard nor easy	3
		rather easy	4
		very easy	5
PP_02	Perceived Playability 2	very bad	1

		rather bad	2
		neither bad nor good	3
		rather good	4
		very good	5
PP_03	Perceived Playability 3	very laggy	1
		rather laggy	2
		neither laggy nor responsive	3
		rather responsive	4
		very responsive	5
PEU_01	Perceived Ease of Use 1	very difficult	1
		rather difficult	2
		neither difficult nor easy	3
		rather easy	4
		very easy	5
PEU_02	Perceived Ease of Use 2	requires a lot of effort	1
		requires rather some effort	2
		requires a neutral amount of effort	3
		requires rather no effort	4
		requires no effort at all	5
PEU_03	Perceived Ease of Use 3	very complicated	1
		rather complicated	2
		neither complicated nor straightforward	3
		rather straightforward	4
		very straightforward	5
PCO_01	Perceived Costs 1	very expensive	1
		rather expensive	2
		neither expensive nor cheap	3
		rather cheap	4
		very cheap	5
PCO_02	Perceived Costs 2	totally unjustified	1
		rather unjustified	2
		neither unjustified nor reasonable	3
		rather reasonable	4
		very reasonable	5

PCO_03	Perceived Costs 3	very bothersome	1
		rather bothersome	2
		neither bothersome nor not troubling	3
		rather not troubling	4
		not troubling at all	5
BIU_01	Behavioral Intention to Use 1	much less	1
		rather less	2
		for the same amount	3
		rather more	4
		a lot more	5
BIU_02	Behavioral Intention to Use 2	very uninterested	1
		rather uninterested	2
		neither uninterested nor interested	3
		rather interested	4
		very interested	5
BIU_03	Behavioral Intention to Use 3	very unmotivated	1
		rather unmotivated	2
		neither unmotivated nor motivated	3
		rather motivated	4
		very motivated	5
Gender	Gender of respondent	Female	0
		Male	1
Age	Age category of respondent	10-20 years	1
		21-35 years	2
		36-50 years	3
		51-65 years	4
		65 years or more	5
Current status	Status of respondent	Student (primary, high school, college, university, etc.)	1
		Employed (part or full time)	2
		Unemployed	3
		Retired	4
		Other	5

Type game	Type of the game played the most by respondent	Action (Fighting games like Tekken, Street Fighter, Smash Brothers or shooters like Call of Duty, Battlefield, Counterstrike, etc.)	1
		Action-adventure (GTA, Assassins Creed, Journey, Minecraft etc.)	2
		Massively Multi Online Player (League of Legends, World of Warcraft, Guild Wars etc.)	3
		RPG (Witcher 3, The Elder Scrolls, Fallout, Dark Souls etc.)	4
		Simulations (PES, FIFA, NBA2K, Forza Horizon, Farming Simulator, The Sims, Rocket League, etc.)	5
		Strategy (Civilization, Card Hunter, Anno 1800 etc.)	6
		Free-to-play (Fortnite, Plague Inc.,etc.)	7
		Mobile games (Candy Crush, Angry Birds, PUBG Mobile)	8
Hours played	Weekly amount of hours spent videogaming	< 1	1
		1-3	2
		3-7	3
		7-12	4
		12-18	5
		18 or more	6

Hours played game	Weekly amount of hours spent playing last game	< 1	1
		1-3	2
		3-7	3
		7-12	4
		12-18	5
		18 or more	6
Money spent MTX	Yearly expenditure on microtransactions for last played game	0	1
		0-19	2
		20-49	3
		50-99	4
		100-200	5
		200 or more	6
Money spent MTX	Yearly expenditure on microtransactions for video games in general	0	1
		0-19	2
		20-49	3
		50-99	4
		100-200	5
		200 or more	6

9.4 Results of survey (English version)

1. Play_game_YN

	Frequencies	% Obs.
Yes	464	86,7%
No	71	13,3%
Total	**535**	**100%**

Effective responses : 535
Response rate : 100%

Non-response(s) : 0
The most quoted modality : Yes
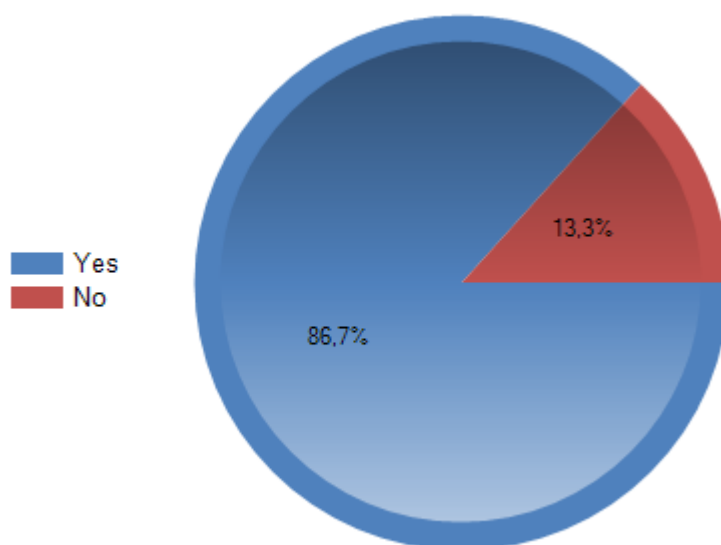
2. Name_game

	No of instances	% Obs.
League	48	10,3%
Rocket	28	6%
Fifa	26	5,6%
Legends	23	5%
Call	20	4,3%
Duty	20	4,3%
Fortnite	16	3,4%
World	14	3%
Animal	10	2,2%
crossing	10	2,2%
...	720	155,2%

The underlined words represent the remarkable items that are the most frequent value.

Effective responses : 464
Response rate : 100%

Non-response(s) : 0
Corpus (total number of words) : 1149 ; Lexicon (number of different words) : 340 ; Most frequent value : League
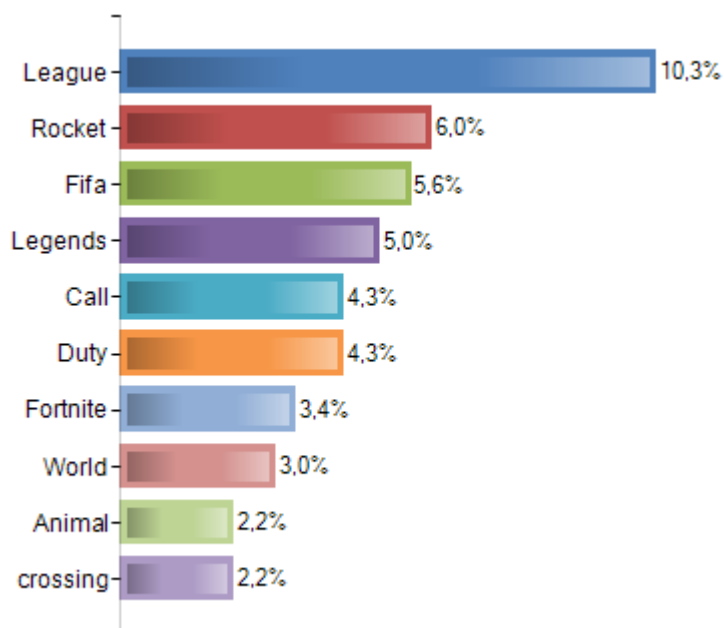
3. PTWMTX
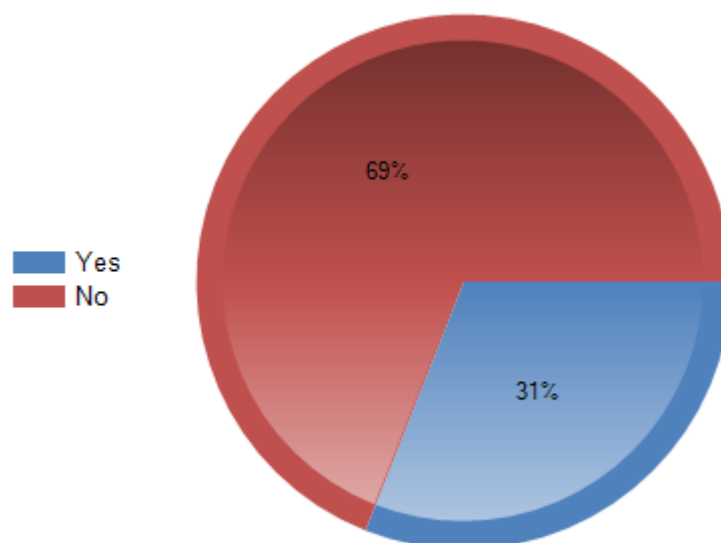
	Frequencies	% Obs.
Yes	144	31%
No	320	69%
Total	**464**	**100%**

Effective responses : 464
Response rate : 100%

Non-response(s) : 0
The most quoted modality : No

4. CMTX

	Frequencies	% Obs.
Yes	181	39%
No	283	61%
Total	**464**	**100%**

Effective responses : 464
Response rate : 100%

Non-response(s) : 0
The most quoted modality : No
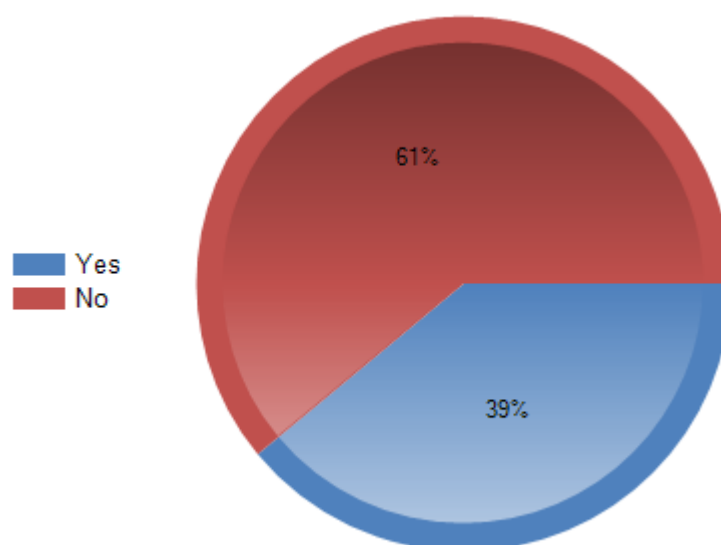
5. PE_01

	Frequencies	% Obs.
very disagreeable	12	2,6%
rather disagreeable	18	3,9%
neither disagreeable nor enjoyable	45	9,7%
rather enjoyable	200	43,1%
very enjoyable	189	40,7%
Total	**464**	**100%**

Effective responses : 464
Response rate : 100%

Non-response(s) : 0
The most quoted modalities : rather enjoyable; very enjoyable; neither disagreeable nor enjoyable
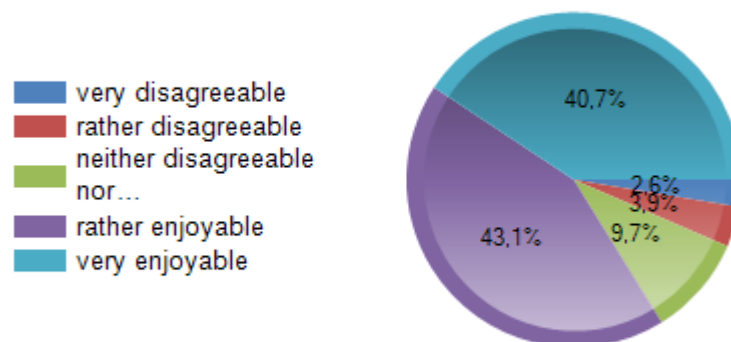
6. PE_02

	Frequencies	% Obs.
very dull	5	1,1%
rather dull	24	5,2%
neither dull nor fun	82	17,7%
rather fun	195	42%
very fun	158	34,1%
Total	**464**	**100%**

Effective responses : 464
Response rate : 100%

Non-response(s) : 0
The most quoted modalities : rather fun; very fun; neither dull nor fun
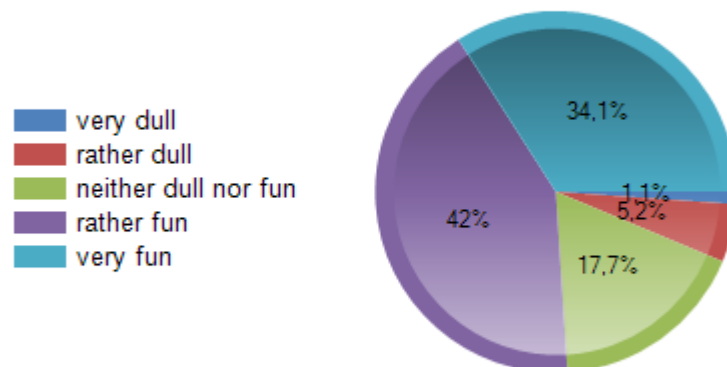
7. PE_03

	Frequencies	% Obs.
very frustrating	15	3,2%
rather frustrating	39	8,4%
neither frustrating nor pleasant	72	15,5%
rather pleasant	196	42,2%
very pleasant	142	30,6%
Total	**464**	**100%**

Effective responses : 464
Response rate : 100%

Non-response(s) : 0
The most quoted modalities : rather pleasant; very pleasant; neither frustrating nor pleasant
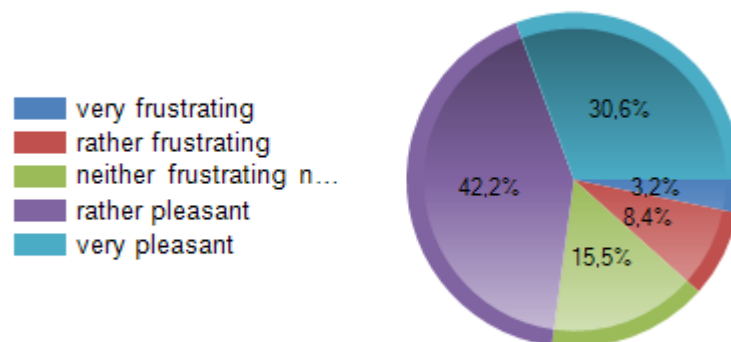
8. PE_04

	Frequencies	% Obs.
very boring	4	0,9%
rather boring	25	5,4%
neither boring nor interesting	111	23,9%
rather interesting	183	39,4%
very interesting	141	30,4%
Total	**464**	**100%**

Effective responses : 464
Response rate : 100%

Non-response(s) : 0
The most quoted modalities : rather interesting; very interesting; neither boring nor interesting
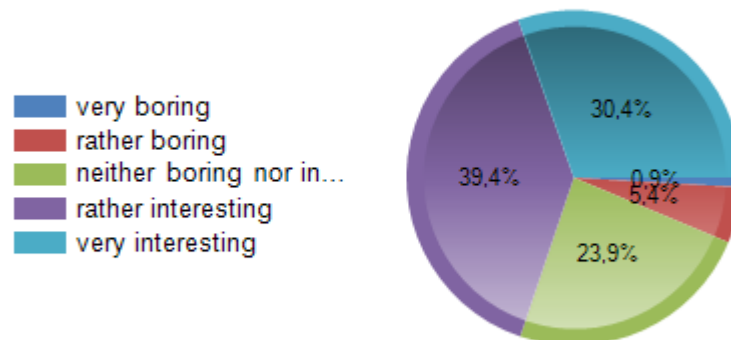
9. PP_01

	Frequencies	% Obs.
very hard	18	3,9%
rather hard	92	19,8%
neither hard nor easy	203	43,8%
rather easy	104	22,4%
very easy	47	10,1%
Total	**464**	**100%**

Effective responses : 464
Response rate : 100%

Non-response(s) : 0
The most quoted modalities : neither hard nor easy; rather easy; rather hard
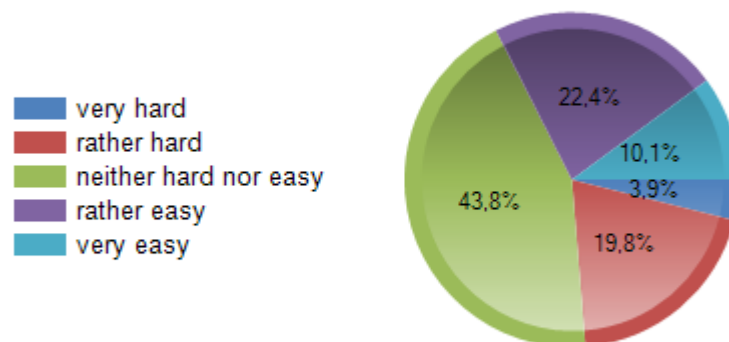
10. PP_02

	Frequencies	% Obs.
very bad	7	1,5%
rather bad	13	2,8%
neither bad nor good	65	14%
rather good	225	48,5%
very good	154	33,2%
Total	**464**	**100%**

Effective responses : 464
Response rate : 100%

Non-response(s) : 0
The most quoted modalities : rather good; very good; neither bad nor good

- very bad
- rather bad
- neither bad nor good
- rather good
- very good

11. PP_03

	Frequencies	% Obs.
very laggy	8	1,7%
rather laggy	22	4,7%
neither laggy nor responsive	85	18,3%
rather responsive	187	40,3%
very responsive	162	34,9%
Total	**464**	**100%**

Effective responses : 464
Response rate : 100%

Non-response(s) : 0
The most quoted modalities : rather responsive; very responsive; neither laggy nor responsive
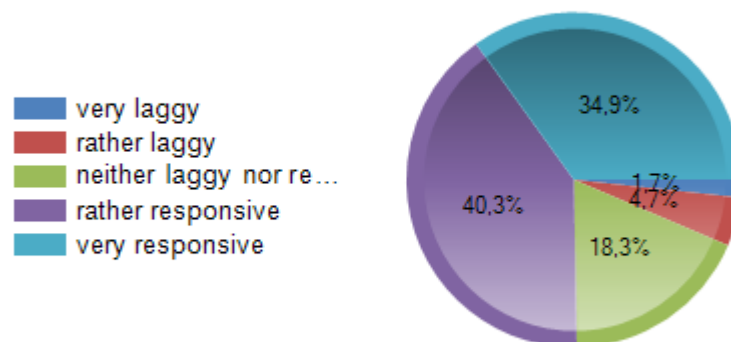
12. PEU_01

	Frequencies	% Obs.
very difficult	7	1,5%
rather difficult	14	3%
neither difficult nor easy	65	14%
rather easy	171	36,9%
very easy	207	44,6%
Total	**464**	**100%**

Effective responses : 464
Response rate : 100%

Non-response(s) : 0
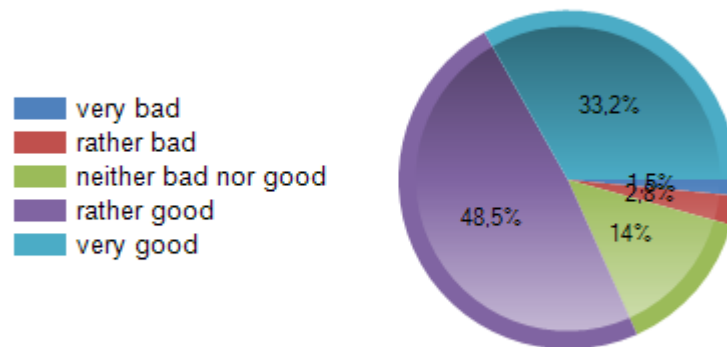**The most quoted modalities : very easy; rather easy; neither difficult nor easy**
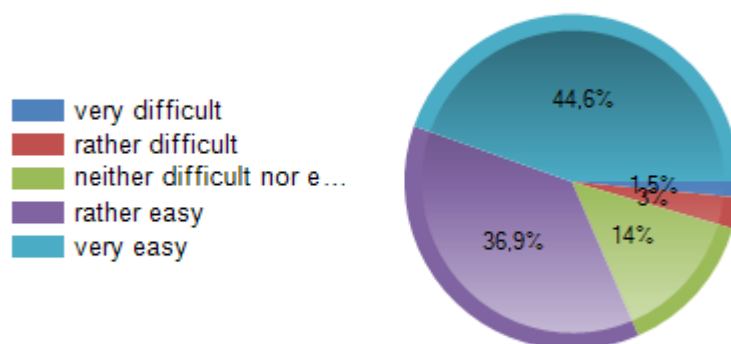
13. PEU_02

	Frequencies	% Obs.
requires a lot of effort	12	2,6%
requires rather some effort	17	3,7%
requires a neutral amount of effort	85	18,3%
requires rather no effort	190	40,9%
requires no effort at all	160	34,5%
Total	**464**	**100%**

Effective responses : 464
Response rate : 100%

Non-response(s) : 0
The most quoted modalities require rather no effort; requires no effort at all; requires a neutral amount of effort

[119]
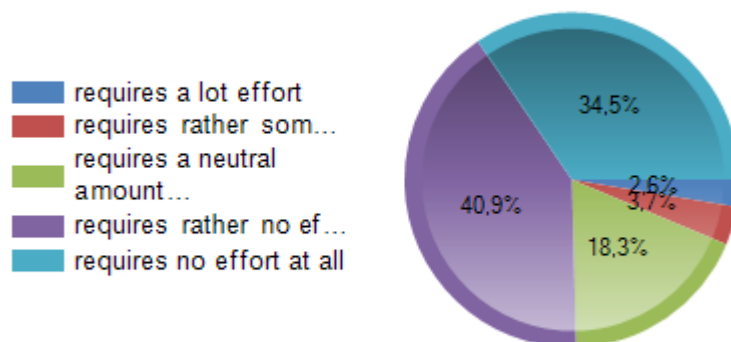
14. PEU_03

	Frequencies	% Obs.
very complicated	10	2,2%
rather complicated	12	2,6%
neither complicated nor straightforward	63	13,6%
rather straightforward	157	33,8%
very straightforward	222	47,8%
Total	**464**	**100%**

Effective responses : 464
Response rate : 100%

Non-response(s) : 0
The most quoted modalities : very straightforward; rather straightforward; neither complicated nor straightforward
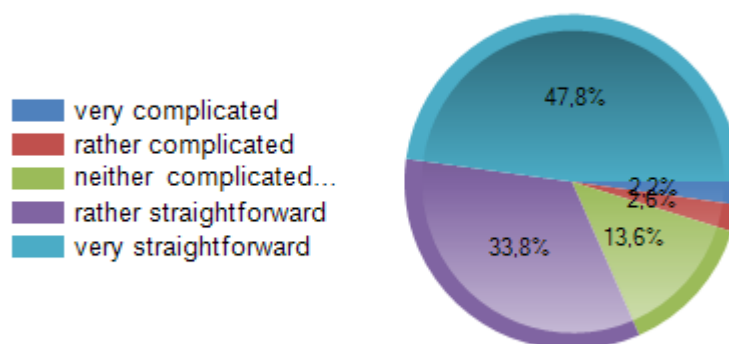
15. PCO_01

	Frequencies	% Obs.
very expensive	53	11,4%
rather expensive	126	27,2%
neither expensive nor cheap	167	36%
rather cheap	92	19,8%
very cheap	26	5,6%
Total	**464**	**100%**

Effective responses : 464
Response rate : 100%

Non-response(s) : 0
The most quoted modalities : neither expensive nor cheap; rather expensive; rather cheap
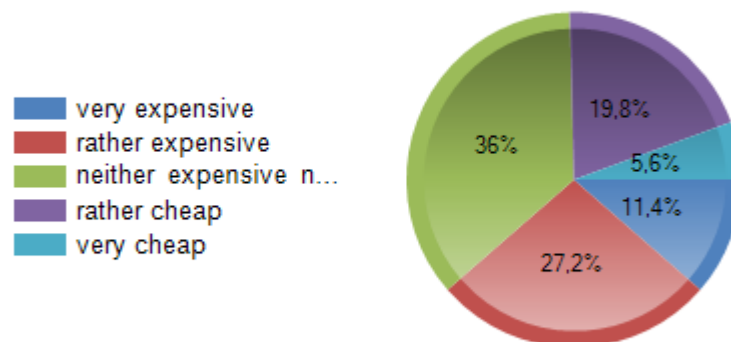
16. PCO_02

	Frequencies	% Obs.
totally unjustified	45	9,7%
rather unjustified	117	25,2%
neither unjustified nor reasonable	156	33,6%
rather reasonable	102	22%
very reasonable	44	9,5%
Total	**464**	**100%**

Effective responses : 464
Response rate : 100%

Non-response(s) : 0
The most quoted modalities : neither unjustified nor reasonable; rather unjustified; rather reasonable
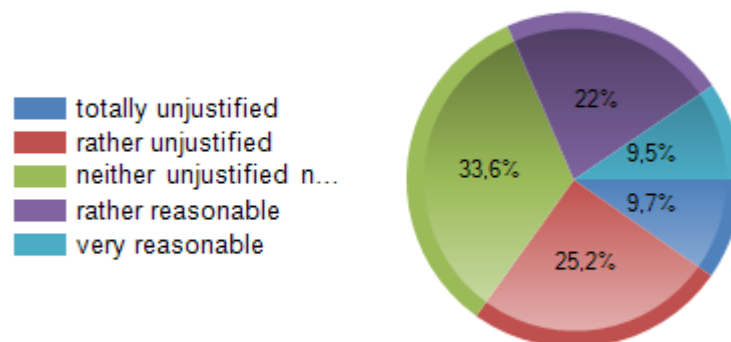
17. PCO_03

	Frequencies	% Obs.
very bothersome	43	9,3%
rather bothersome	93	20%
neither bothersome nor not troubling	202	43,5%
rather not troubling	82	17,7%
not troubling at all	44	9,5%
Total	**464**	**100%**

Effective responses : 464
Response rate : 100%

Non-response(s) : 0
The most quoted modalities : neither bothersome nor not troubling; rather bothersome; rather not troubling
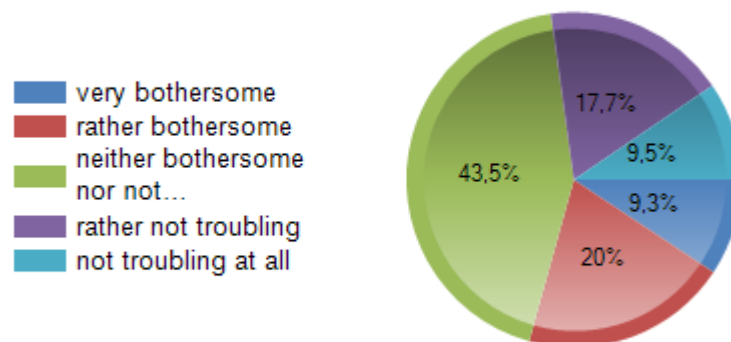
18. BIU_01

	Frequencies	% Obs.
much less	12	2,6%
rather less	61	13,1%
for the same amount	192	41,4%
rather more	156	33,6%
a lot more	43	9,3%
Total	**464**	**100%**

Effective responses : 464
Response rate : 100%

Non-response(s) : 0
The most quoted modalities : for the same amount; rather more; rather less

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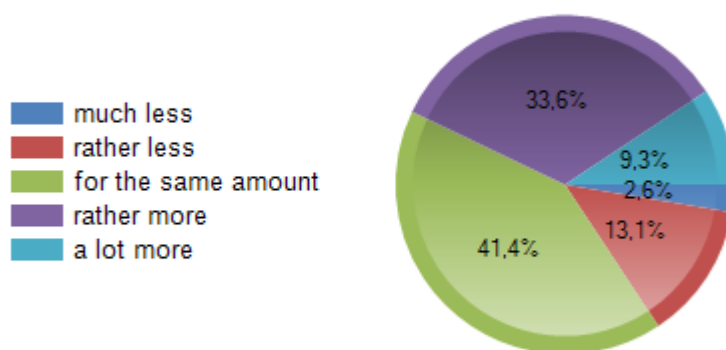
19. BIU_02

	Frequencies	% Obs.
very uninterested	13	2,8%
rather uninterested	36	7,8%
neither uninterested nor interested	133	28,7%
rather interested	186	40,1%
very interested	96	20,7%
Total	**464**	**100%**

Effective responses : 464
Response rate : 100%

Non-response(s) : 0
The most quoted modalities : rather interested; neither uninterested nor interested; very interested
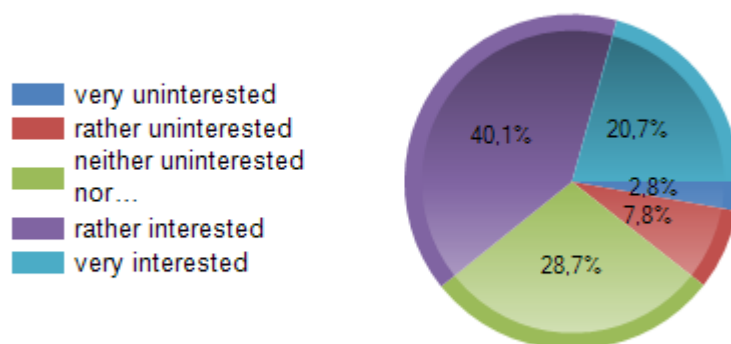
20. BIU_03

	Frequencies	% Obs.
very unmotivated	12	2,6%
rather unmotivated	44	9,5%
neither unmotivated nor motivated	145	31,2%
rather motivated	183	39,4%
very motivated	80	17,2%
Total	**464**	**100%**

Effective responses : 464
Response rate : 100%

Non-response(s) : 0
The most quoted modalities : rather motivated; neither unmotivated nor motivated; very motivated
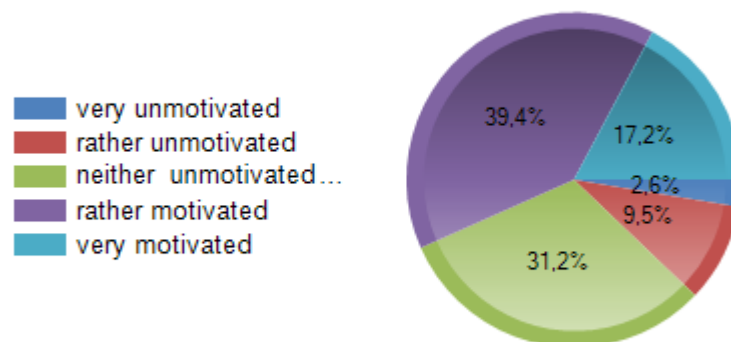
21. Gender

	Frequencies	% Resp.
Male	342	64,2%
Female	191	35,8%
Total	**533**	**100%**

Effective responses : 533
Response rate : 99,6%

Non-response(s) : 2
The most quoted modality : Male
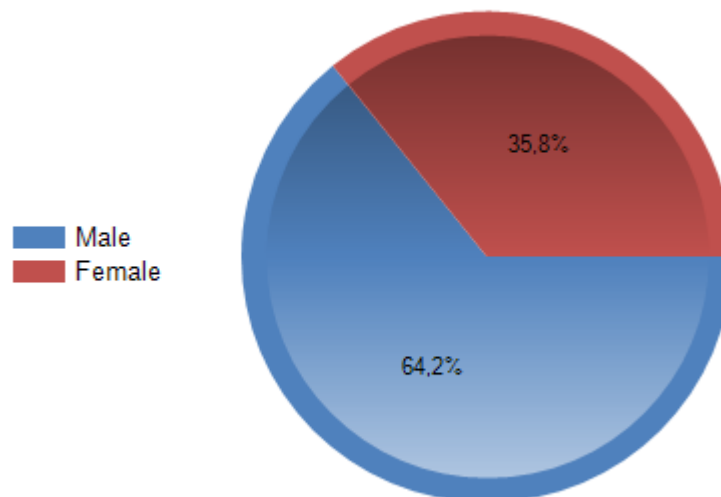
22. Age

	Frequencies	% Obs.
10-20 years	116	21,7%
21-35 years	370	69,2%
36-50 years	42	7,9%
51-65 years	6	1,1%
65 years or more	1	0,2%
Total	**535**	**100%**

Effective responses : 535
Response rate : 100%

Non-response(s) : 0
The most quoted modalities : 21-35 years; 10-20 years; 36-50 years
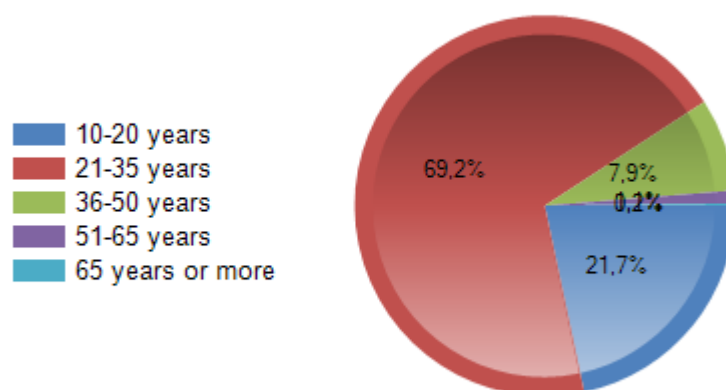
23. Status

	Frequencies	% Obs.
Student (primary, high school, college, university, etc.)	292	54,6%
Employed (part or full time)	210	39,3%
Unemployed	26	4,9%
Retired	3	0,6%
Other	4	0,7%
Total	**535**	**100%**

Effective responses : 535
Response rate : 100%

Non-response(s) : 0
The most quoted modalities : Student (primary, high school, college, university, etc.); Employed (part or full time); Unemployed

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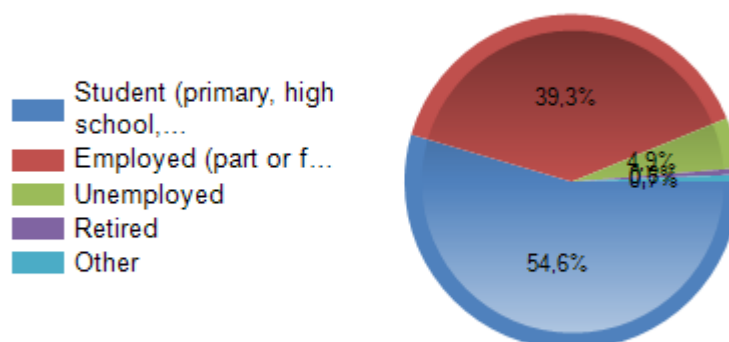
24. Type_game

	Frequencies	% Obs.
Action (Fighting games like Tekken, Street Fighter, Smash Brothers or shooters like Call of Duty, Battlefield, Counterstrike, etc.)	76	16,4%
Action-adventure (GTA, Assassins Creed, Journey, Minecraft etc.)	70	15,1%
Massively Multi Online Player (League of Legends, World of Warcraft, Guild Wars etc.)	45	9,7%
RPG (Witcher 3, The Elder Scrolls, Fallout, Dark Souls etc.)	66	14,2%
Simulations (PES, FIFA, NBA2K, Forza Horizon, Farming Simulator, The Sims, Rocket League, etc.)	92	19,8%
Strategy (Civilization, Card Hunter, Anno 1800 etc.)	28	6%
Free-to-play (Fortnite, Plague Inc.,etc.)	39	8,4%
Mobile games (Candy Crush, Angry Birds, PUBG Mobile)	48	10,3%
Total	**464**	**100%**

Effective responses : 464
Response rate : 100%

Non-response(s) : 0
The most quoted modalities : Simulations (PES, FIFA, NBA2K, Forza Horizon, Farming Simulator, The Sims, Rocket League,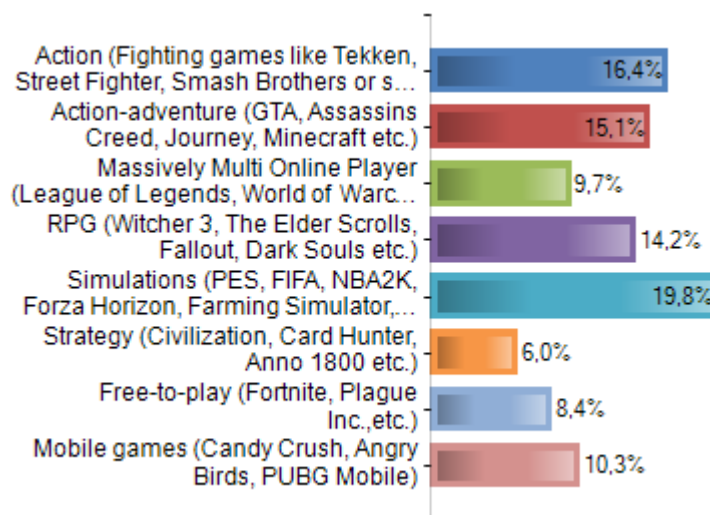 etc.); Action (Fighting games like Tekken, Street Fighter, Smash Brothers or shooters like Call of Duty, Battlefield, Counterstrike, etc.); Action-adventure (GTA, Assassins Creed, Journey, Minecraft etc.)

25. Hours_played

	Frequencies	% Obs.
< 1	29	6,2%
1-3	86	18,5%
3-7	109	23,5%
7-12	118	25,4%
12-18	65	14%
18 or more	57	12,3%
Total	**464**	**100%**

Effective responses : 464
Response rate : 100%

Non-response(s) : 0
The most quoted modalities : 7-12; 3-7; 1-3
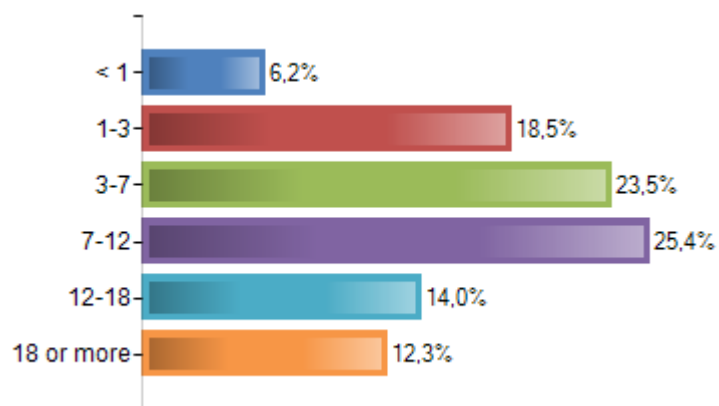
26. Hours_played_game

	Frequencies	% Obs.
< 1	51	11%
1-3	111	23,9%
3-7	160	34,5%
7-12	77	16,6%
12-18	36	7,8%
18 or more	29	6,2%
Total	**464**	**100%**

Effective responses : 464
Response rate : 100%

Non-response(s) : 0
The most quoted modalities : 3-7; 1-3; 7-12
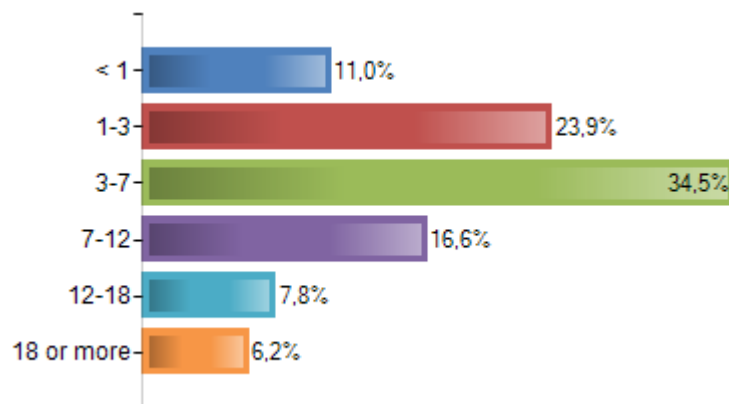
27. Money_spent_game

	Frequencies	% Obs.
0	216	46,6%
1-19	90	19,4%
20-49	67	14,4%
50-99	55	11,9%
100-200	18	3,9%
200 or more	18	3,9%
Total	**464**	**100%**

Effective responses : 464
Response rate : 100%

Non-response(s) : 0
The most quoted modalities : 0; 1-19; 20-49
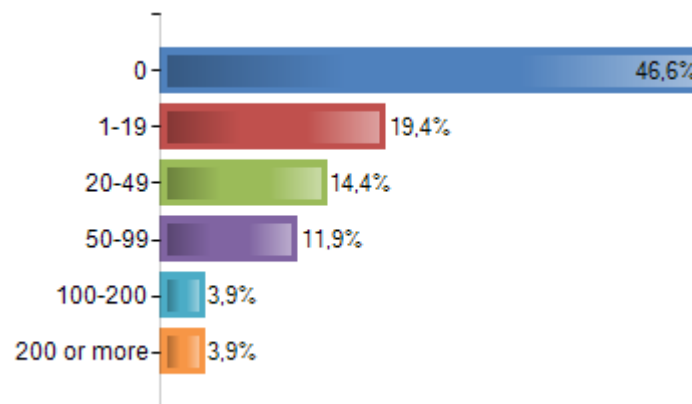
28. Money_spent

	Frequencies	% Obs.
0	195	36,4%
1-19	78	14,6%
20-49	66	12,3%
50-99	99	18,5%
100-200	53	9,9%
200 or more	44	8,2%
Total	**535**	**100%**

Effective responses : 535
Response rate : 100%

Non-response(s) : 0
The most quoted modalities : 0; 50-99; 1-19
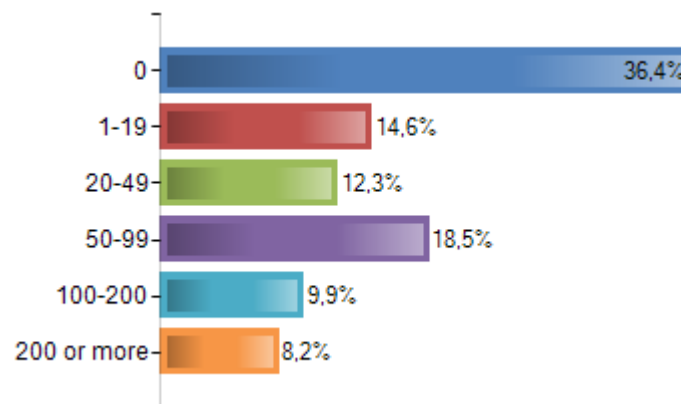
29. Date of entry

	Frequencies	% Obs.
March	328	61,3%
April	207	38,7%
Total	**535**	**100%**

Effective responses : 535
Response rate : 100%

Non-response(s) : 0
The most quoted date : March ; Period : from 17/03/2021 13:43:49 to 26/04/2021 22:20:34 ; Grouping : Month

9.5 Independent Samples Test

PTW		Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PE	Equal	34.28	0.00	8.66	462.00	0.000	0.647	0.07	0.50	0.79
	Equal			7.53	205.00	0.000	0.647	0.09	0.48	0.82
PP	Equal	5.50	0.02	6.28	462.00	0.000	0.395	0.06	0.27	0.52
	Equal			5.84	234.31	0.000	0.395	0.07	0.26	0.53
PEU	Equal	18.79	0.00	-4.06	462.00	0.000	-0.319	0.08	-0.47	-0.16
	Equal			-4.72	399.59	0.000	-0.319	0.07	-0.45	-0.19
PCO	Equal	0.17	0.68	2.12	462.00	0.035	0.207	0.10	0.02	0.40
	Equal			2.19	297.26	0.030	0.207	0.09	0.02	0.39
BIU	Equal	9.51	0.00	4.80	462.00	0.000	0.403	0.08	0.24	0.57
	Equal			4.44	230.71	0.000	0.403	0.09	0.22	0.58

C		Equality of Variances		t-test for Equality of Means					95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
PE	Equal	7.360	0.007	-1.457	462.000	0.146	-0.111	0.076	-0.261	0.039
	Equal			-1.527	438.203	0.128	-0.111	0.073	-0.254	0.032
PP	Equal	5.512	0.019	-1.697	462.000	0.090	-0.105	0.062	-0.227	0.017
	Equal			-1.769	433.212	0.078	-0.105	0.059	-0.222	0.012
PEU	Equal	30.761	0.000	-5.810	462.000	0.000	-0.425	0.073	-0.569	-0.281
	Equal			-6.445	460.404	0.000	-0.425	0.066	-0.555	-0.296
PCO	Equal	0.027	0.869	-2.203	462.000	0.028	-0.204	0.092	-0.385	-0.022
	Equal			-2.218	392.709	0.027	-0.204	0.092	-0.384	-0.023
BIU	Equal	10.014	0.002	-3.649	462.000	0.000	-0.294	0.080	-0.452	-0.135
	Equal			-3.762	421.024	0.000	-0.294	0.078	-0.447	-0.140

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9.6 Regression output

Table 13 - Regression between CMTX and PE

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	3.957	.048		83.156	.000
	CMTX	.111	.076	.068	1.457	.146

Table 14 - Regression between PTWMTX and PE

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
2	(Constant)	4.201	.042		100.988	.000
	PTWMTX	-.647	.075	-.374	-8.664	.000

Table 15 - Regression between CMTX and PEU

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
5	(Constant)	3.980	.046		87.071	.000
	CMTX	.425	.073	.261	5.810	.000

Table 16 - Regression between PTWMTX and PEU

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
6	(Constant)	4.047	.044		92.490	.000
	PTWMTX	.319	.079	.186	4.060	.000

Table 17 - Regression between CMTX and PCO

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
7	(Constant)	2.839	.058		49.139	.000
	CMTX	.204	.092	.102	2.203	.028

Table 18 - Regression between PTWMTX and PCO

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
8	(Constant)	2.982	.054		54.876	.000
	PTWMTX	-.207	.098	-.098	-2.120	.035

Table 19 - Regression between CMTX and BIU

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
9	(Constant)	3.423	.050		68.125	.000
	CMTX	.294	.080	.167	3.649	.000

Table 20 - Regression between PTWMTX and BIU

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
10	(Constant)	3.663	.047		78.304	.000
	PTWMTX	-.403	.084	-.218	-4.803	.000